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CONVERSATIONS LEXICON.

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PROFESSOR OF NATURAL PHILOSOPHY

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the Library in Half-Vols. I. and II. on the same
and in substitution for the one by the late Dr.

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by the late Dr. R. D. THOMSON.

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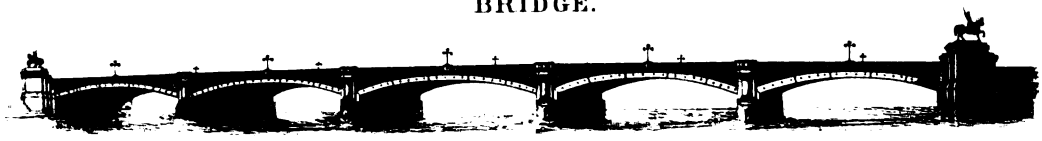
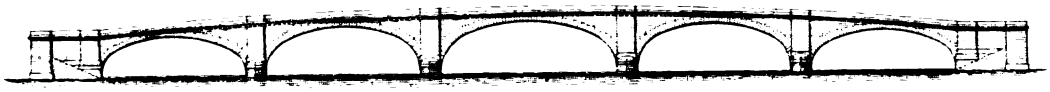
BRIDGE.

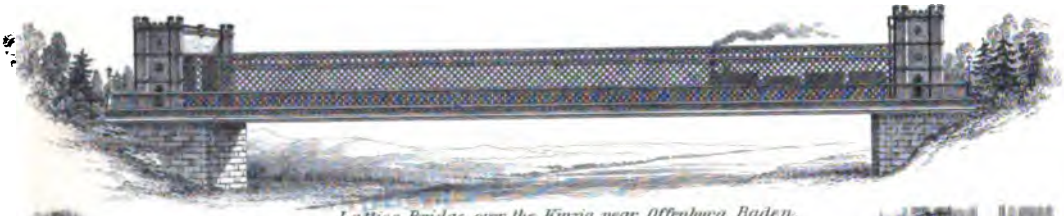


Blackfriars Bridge. Opened 6 Nov: 1869.

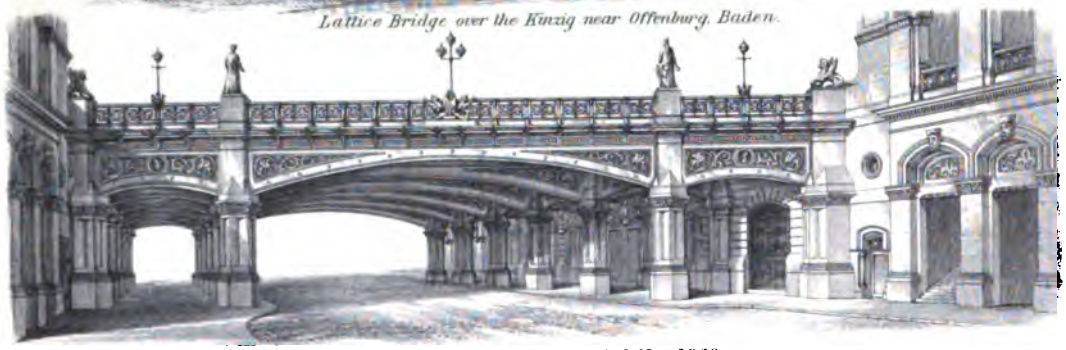


London Bridge

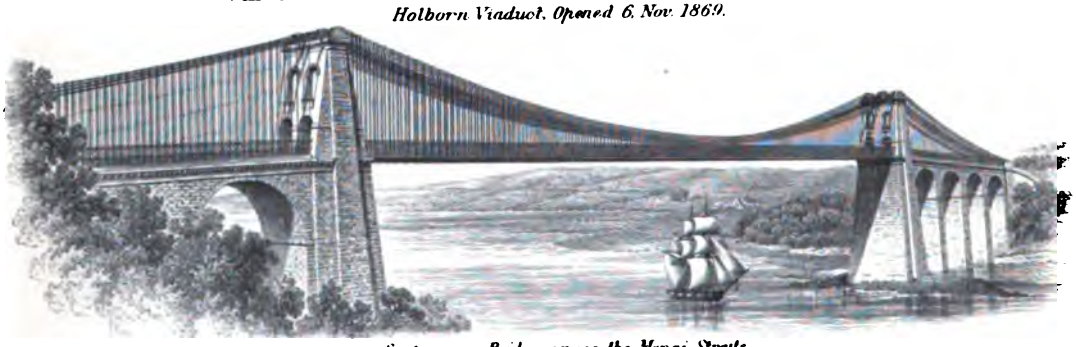
Waterloo Bridge.



Lattice Bridge over the Kinzig near Offenburg, Baden.

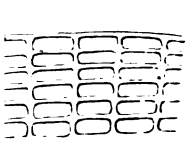


Holborn Viaduct. Opened 6 Nov: 1869.



Suspension Bridge across the Menai Straits.

Albert Bridge Glasgow. Opened May 1871



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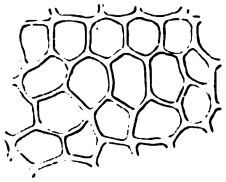

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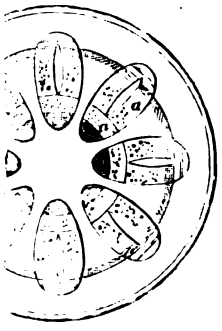

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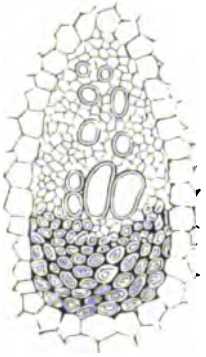

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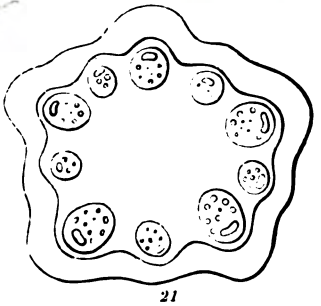

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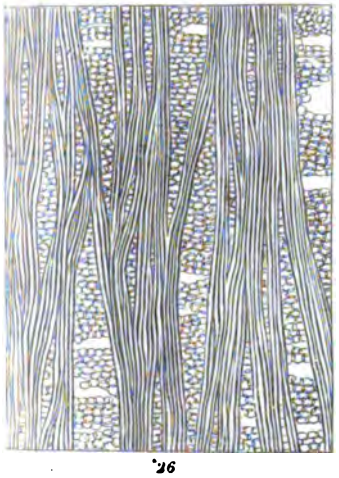

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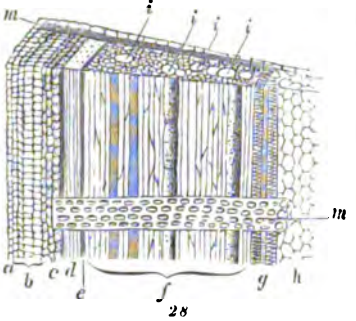

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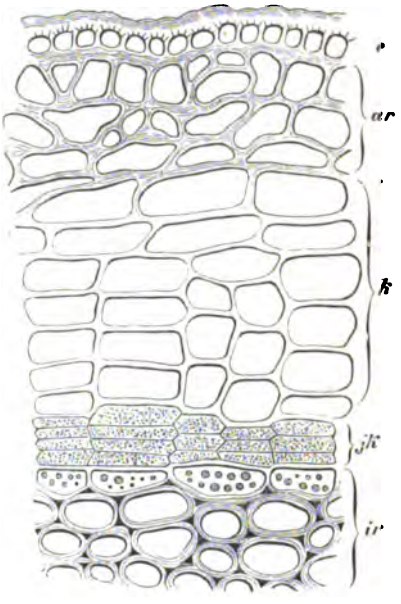

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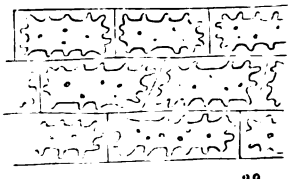

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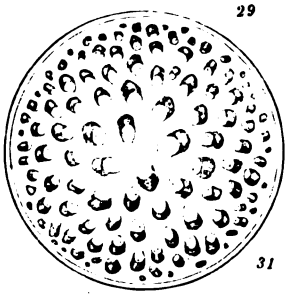

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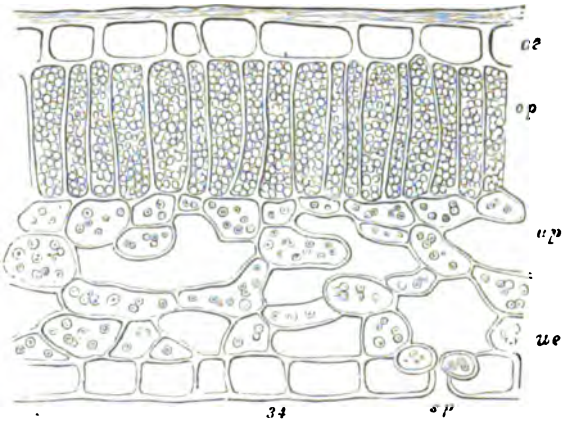

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adinal sections of vascular tissue in a Fern. [15] Do. of young Alder root. [16, 17] Root-hairs. [18, 19] Ideal cross section of a Dicotyledonous stem. [24] Cross section of Black Currant Bark. [25, 26] Cross and longitudinal sections of liber in Lime tree. [27] Ideal section of a Dicotyledonous stem. Dicotyledonous vascular bundle. [31] Longitudinal section of Root stock of Iris. [34] Vertical section of Beech leaf.

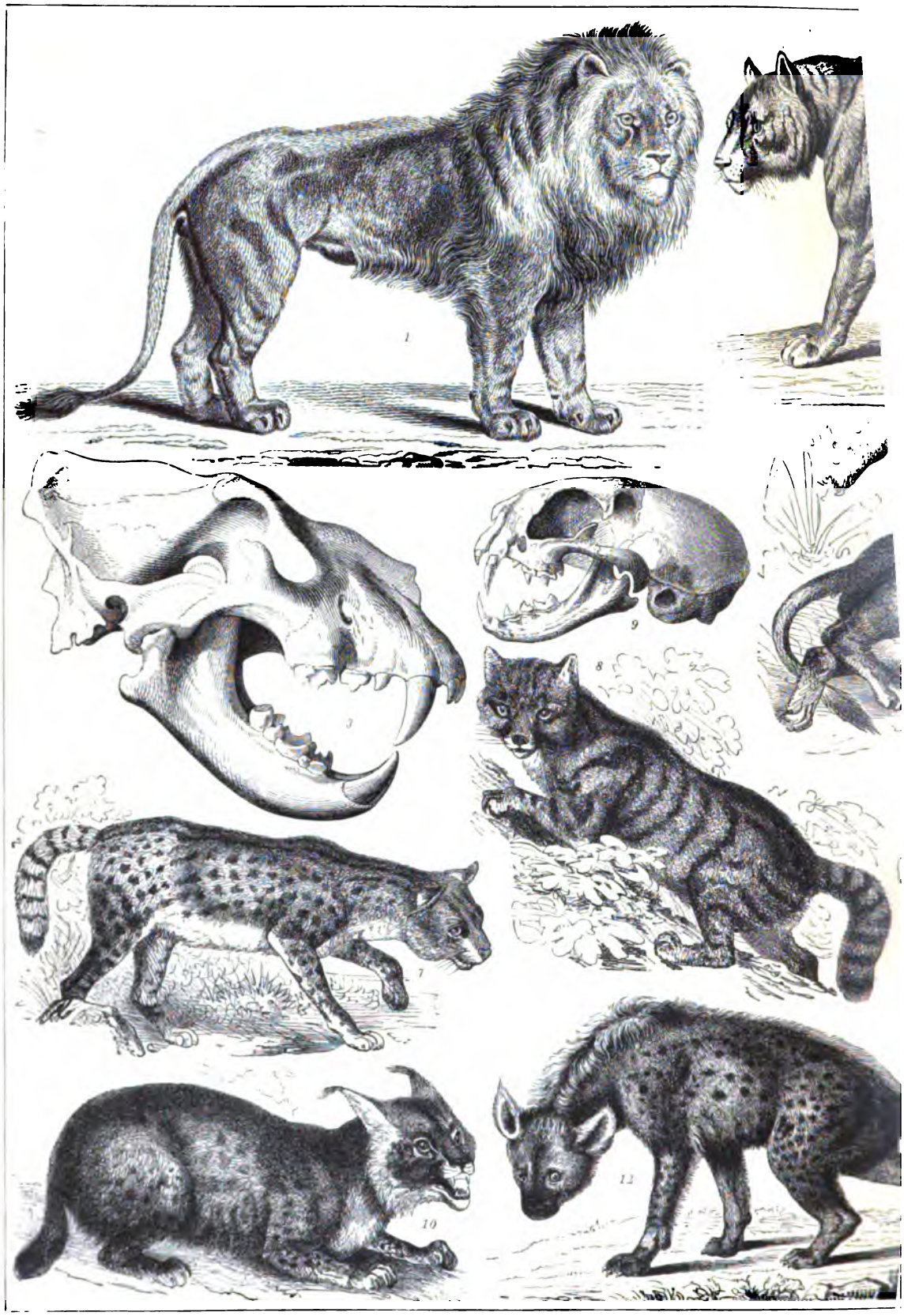
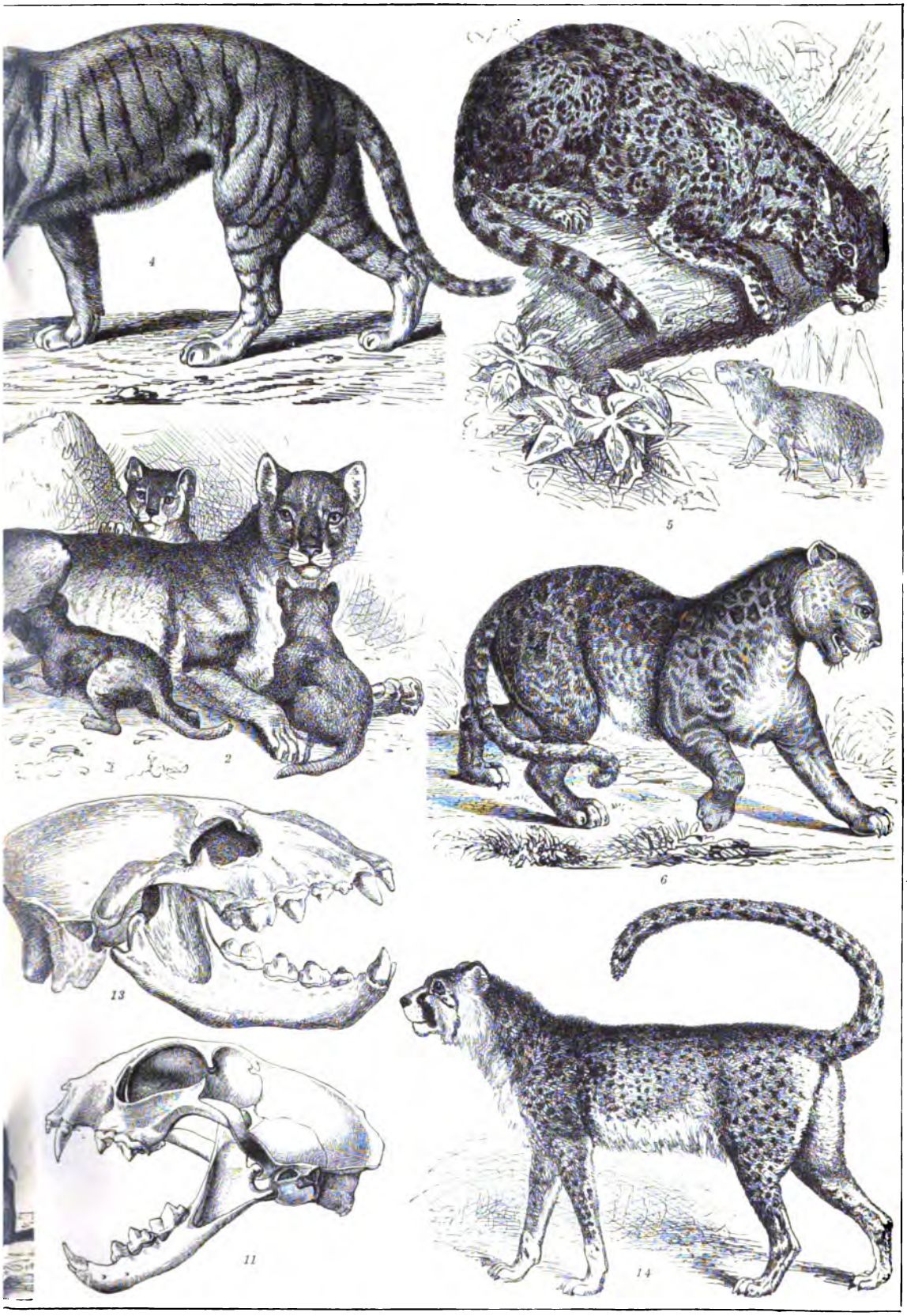


Fig. 1 Lion. 2 Lioness. 3 Skull of Lion. 4 Tiger. 5 Jaguar. 6 Leopard. 7 Serval. 8 Wil



[9] Skull of the Cat. [10] Lynx. [11] Skull of Lynx. [12] Spotted Hyæna. [13] Skull of Hyæna. [14] Chetah.

Fig. 1 Arctic Wolf. 2 Hunting Dog or Hyæna-Dog. 3 Wolf. 4 Skull of Wolf. 5 Dhole or Khol-sun. 6 Jackal. 7 Brazilian F
12 Weasel 13 Polecat.

[8] Common Fox. [9] Fennec. [10] Civet. [11] Genet. [12] Zibet. [13] Ichneumon. [14] Rasse. [15] Marten. [16] Skull of Marten. [19] Otter. [20] Skull of Otter.

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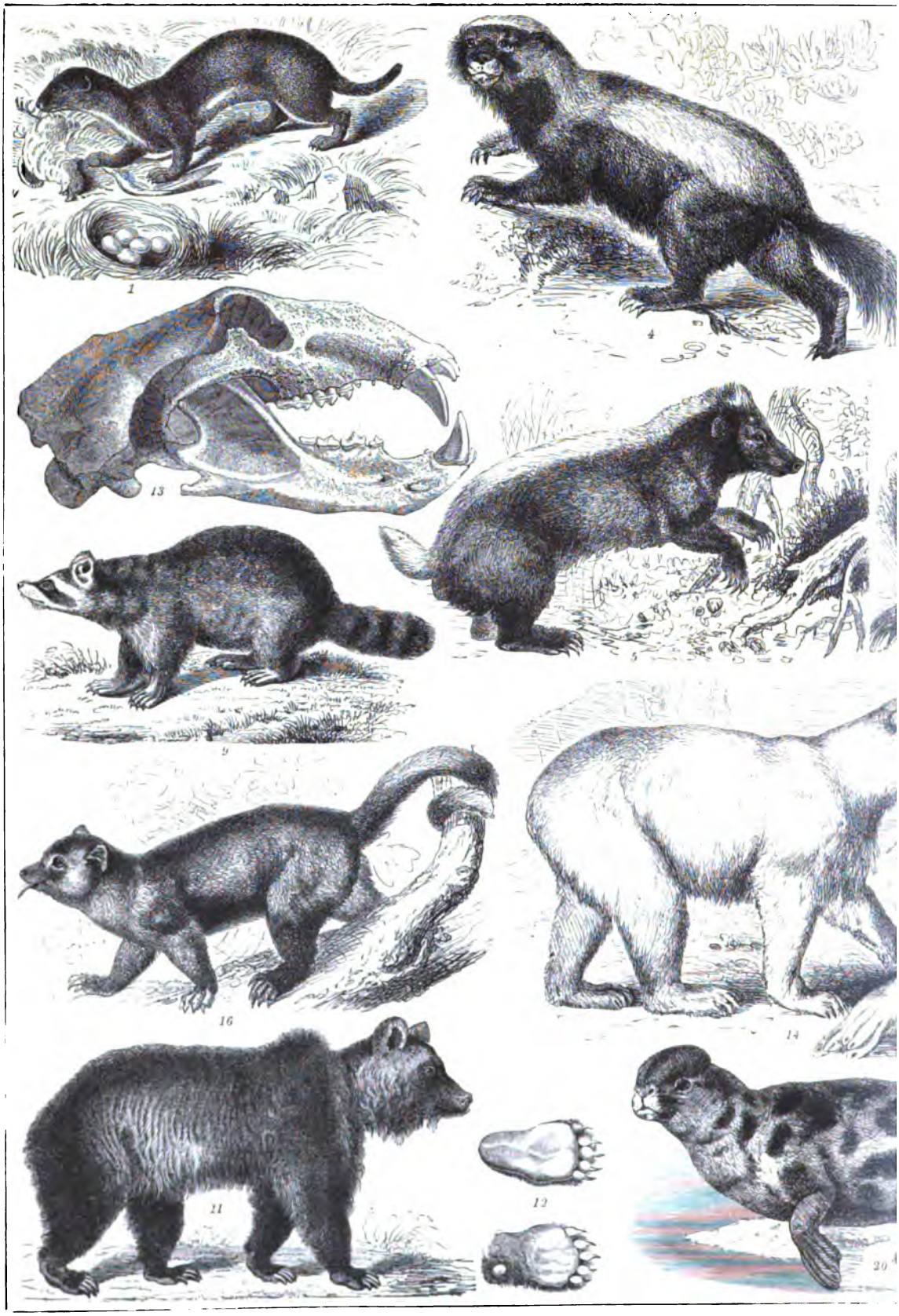


Fig ¹ Ermine. ² Glutton or Wolverene. ³ Skull of do. ⁴ Ratel. ⁵ Teledu. ⁶ Common Badger. ⁷ Skull of do. ⁸ Skunk. ¹⁰ Kinkajou or Potto. ¹⁷ Common Seal. ¹⁸ Skul

[9] Racoon. [10] Coati. [11] Brown Bear. [12] Fore and Hind Foot of Bear. [13] Skull of Bear. [14] Polar Bear. [15] Binturong.
[16] Mon of Seal. [19] Skull of Seal. [20] Crested Seal.

The Rinkanfoss Norway.
Height [illegible] feet.

The Passevache Switzerland
Height [illegible] feet

Niagara from the American side. Height 160 feet.

Fall of Tenquedama New Granada.
Height 574 feet

Cascade of Kambaganga. Senegambia.
Height 535 feet.

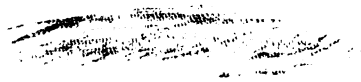
[illegible]

CLOUD. WATER-SPOUT.

1. Cirrus.

2. Cumulus.

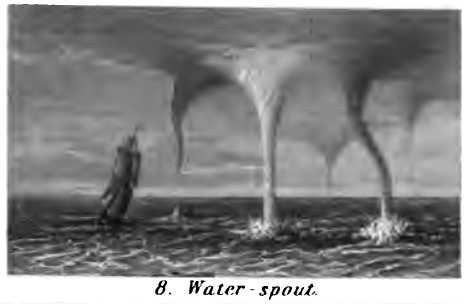
3. Stratus.



4. Cirro-cumulus.

5. Cirro-stratus.

6. Cumulo-stratus.



8. Water-spout.

C. Wands.

7. Cumulo-cirro-stratus, or Nimbus.

R. Anderson.

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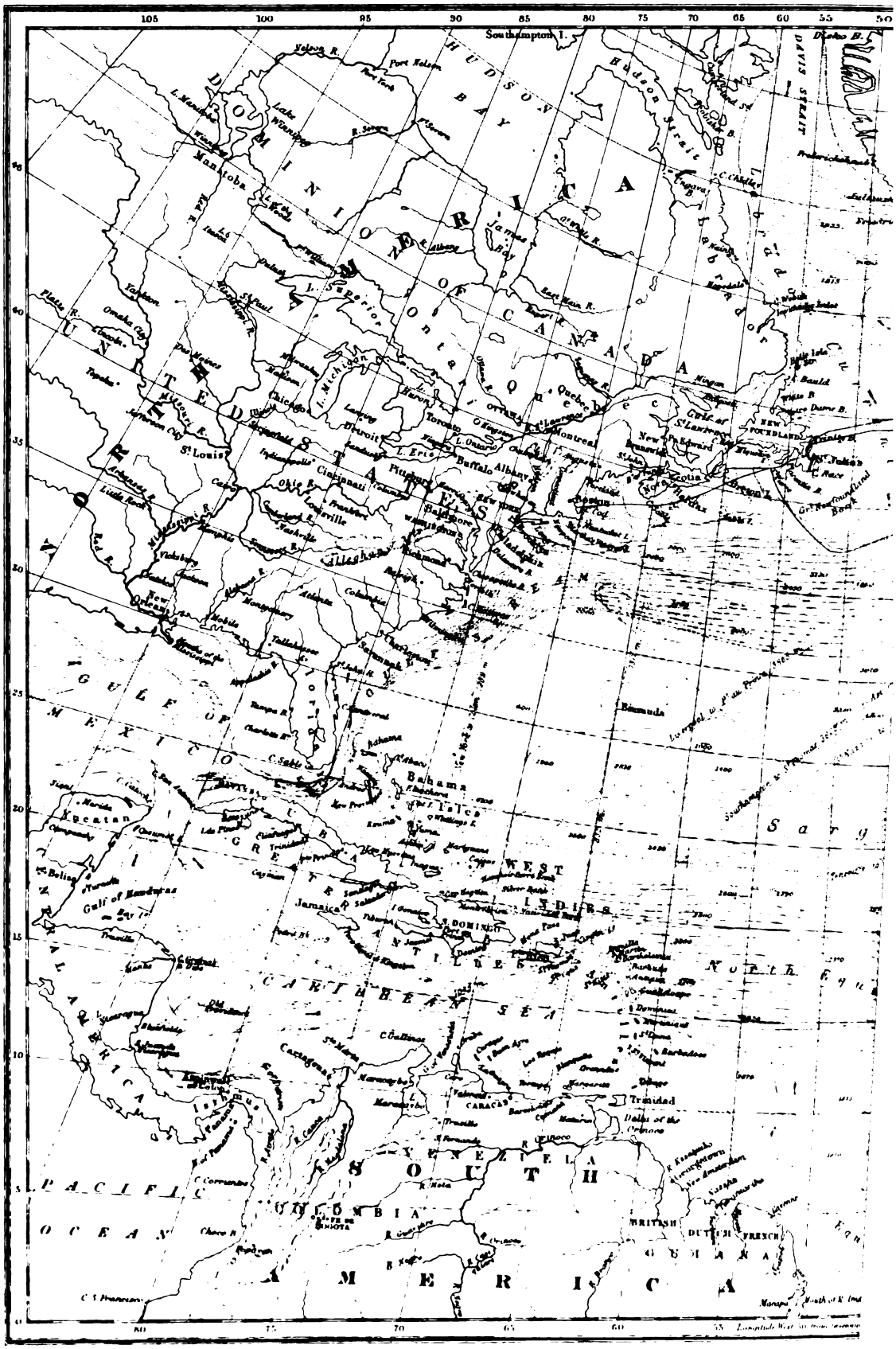
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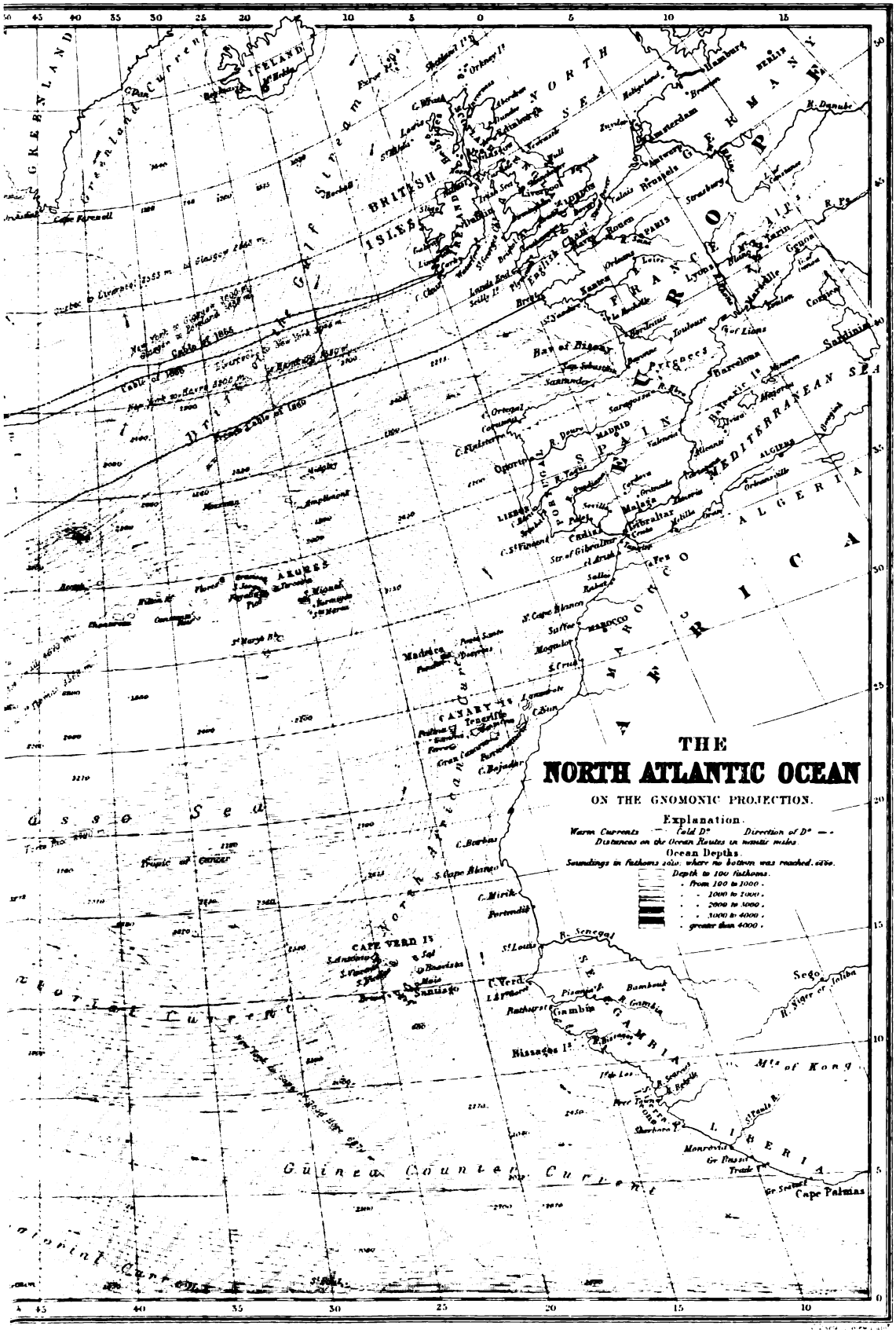
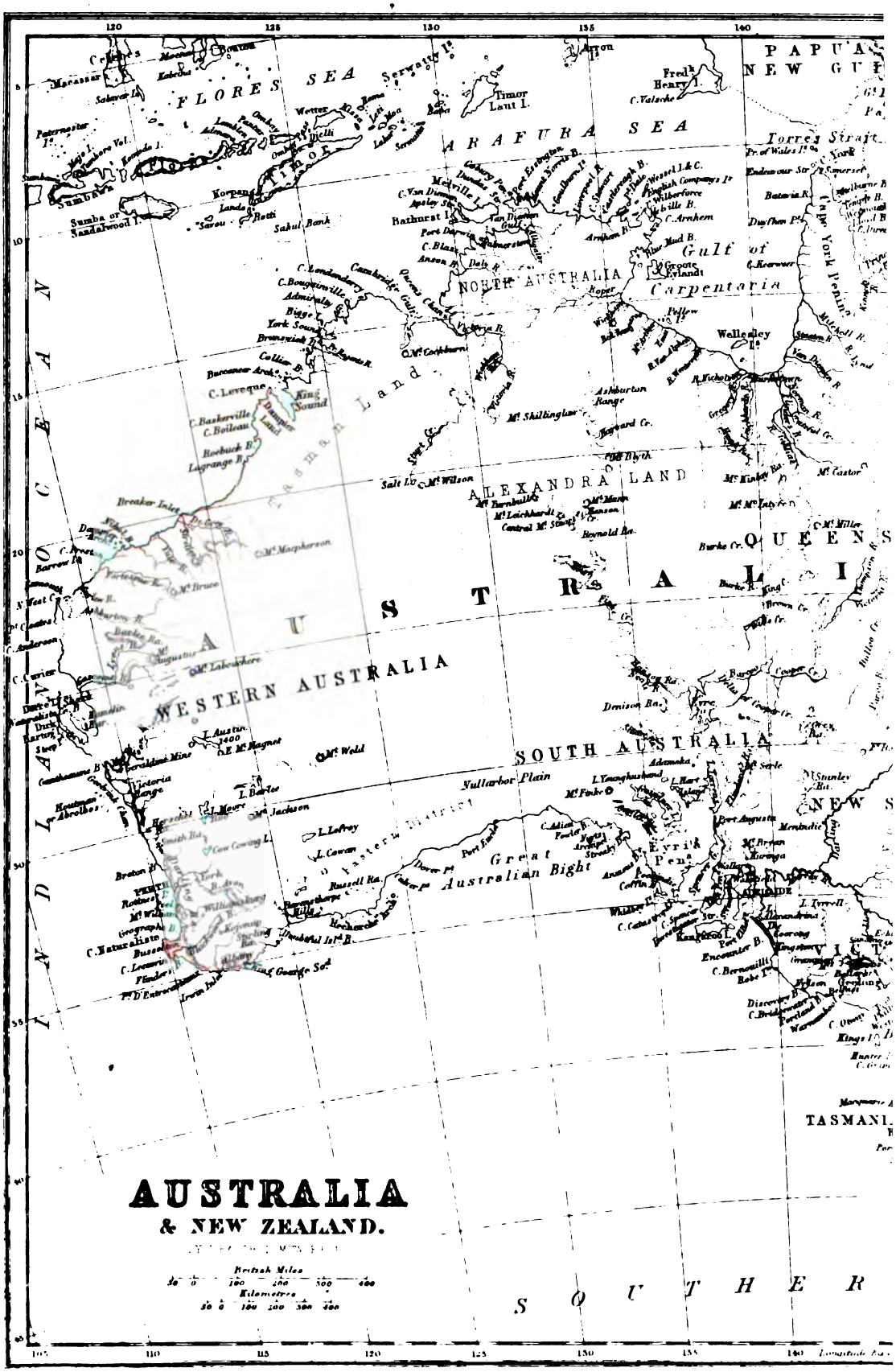
Hudson Strait
DOMINION OF CANADA
Labrador
NEWFOUNDLAND
UNITED STATES
Manitoba
Lake Winnipeg
Port Nelson
Port Essington
Fort Simpson
Fort Resolution
Fort Yukon
Fort Norman
Fort Liard
Fort Dunvegan
Fort Vermilion
Fort Chipewyan
Fort Simpson
Fort Wrangel
Fort Selkirk


THE
NORTH ATLANTIC OCEAN
ON THE GNOMONIC PROJECTION.
Explanation.
Warm Currents — Cold Dº — Direction of Dº —.
Distances on the Ocean Routes in nautic miles.
Ocean Depths.
Soundings in fathoms solo: where no bottom was reached, also.
Depth to 100 fathoms.
From 100 to 1000.
1000 to 2000.
2000 to 3000.
3000 to 4000.
greater than 4000.
GREENLAND
ICELAND
BRITISH ISLES
NORTH SEA
FRANCE
SPAIN
PORTUGAL
MEDITERRANEAN SEA
ALGERIA
MOROCCO
AFRICA
AZORES
CANARY Is
CAPE VERD Is
Cape Palmas
Guinea Counter Current


AUSTRALIA
& NEW ZEALAND.
FLORES SEA
ARAFURA SEA
TIMOR
Timor Laut I.
Sumba or Sandalwood I.
Sumbawa
Roti
Sahul Bank
Arafura Sea
Gulf of Carpentaria
NORTH AUSTRALIA
Cambridge Gulf
King Sound
Buccaneer Arch.
Collier B.
Lagrange Bs.
Roebuck B.
Dampier Land
Ashburton Range
Mt Shillinglaw
Wellesley Is.
Mt Wilson
Salt Lo.
ALEXANDRA LAND
Mt Castor
Mt Miller
Breaker Inlet
Mt Macpherson
Mt Bruce
Mt Augustus
Mt Lakeshore
WESTERN AUSTRALIA
SOUTH AUSTRALIA
Nullarbor Plain
Great Australian Bight
Mt Weld
Mt Magnet
Mt Finke
Mt Serle
Mt Stanley
Mt Brown
Eyre's Pen.
Torres Strait
Gulf of York Peninsula
Endeavour Str.
Batavia R.
Wilberforce
C. Arnhem
Arnhem B.
Liverpool R.
Melville I.
Bathurst I.
Apsley Str.
C. Van Diemen
Port Dundas
C. Blaze
Anson B.
Delft B.
Croker I.
Port Essington
Victoria R.
Roper
Wilton R.
Bed Town
Peffer I.
Mt Cockburn
Mt Hicks
Mt Kinloch
Mt Mc Intyre
Mt Mann
Mt Leichhardt
Central Mt Stuart
Reynold Ra.
Burke Cr.
Burke R.
Denison Ra.
Barrow Cr.
Cooper Cr.
Strzelecki Cr.
Queensland
Mt Brown
Encounter B.
C. Bernouilli
Babe I.
Kangaroo I.
Yorke Pen.
Spencer Gulf
Gulf St Vincent
Port Lincoln
Port Augusta
Port Pirie
Port Adelaide
Adelaide
Mt Lofty Ra.
Flinders Ra.
Barrier Ra.
Mt Remarkable
Mt Arden
Mt Serle
Mt Stanley
Mt Brown
Meningie
Murray R.
Lake Alexandrina
Lake Albert
Lake Victoria
Lake Torrens
Lake Gairdner
Lake Eyre
Lake Frome
Lake Callabonna
Lake Blanche
Lake Hope
Lake Yamma Yamma
Lake Bancannia
Lake Wells
Lake Mackay
Lake Amadeus
Lake Macdonald
Lake Nash
Lake Nash
Lake Mueller
Lake Tyrrell
Lake Buchanan
Lake Corangamite
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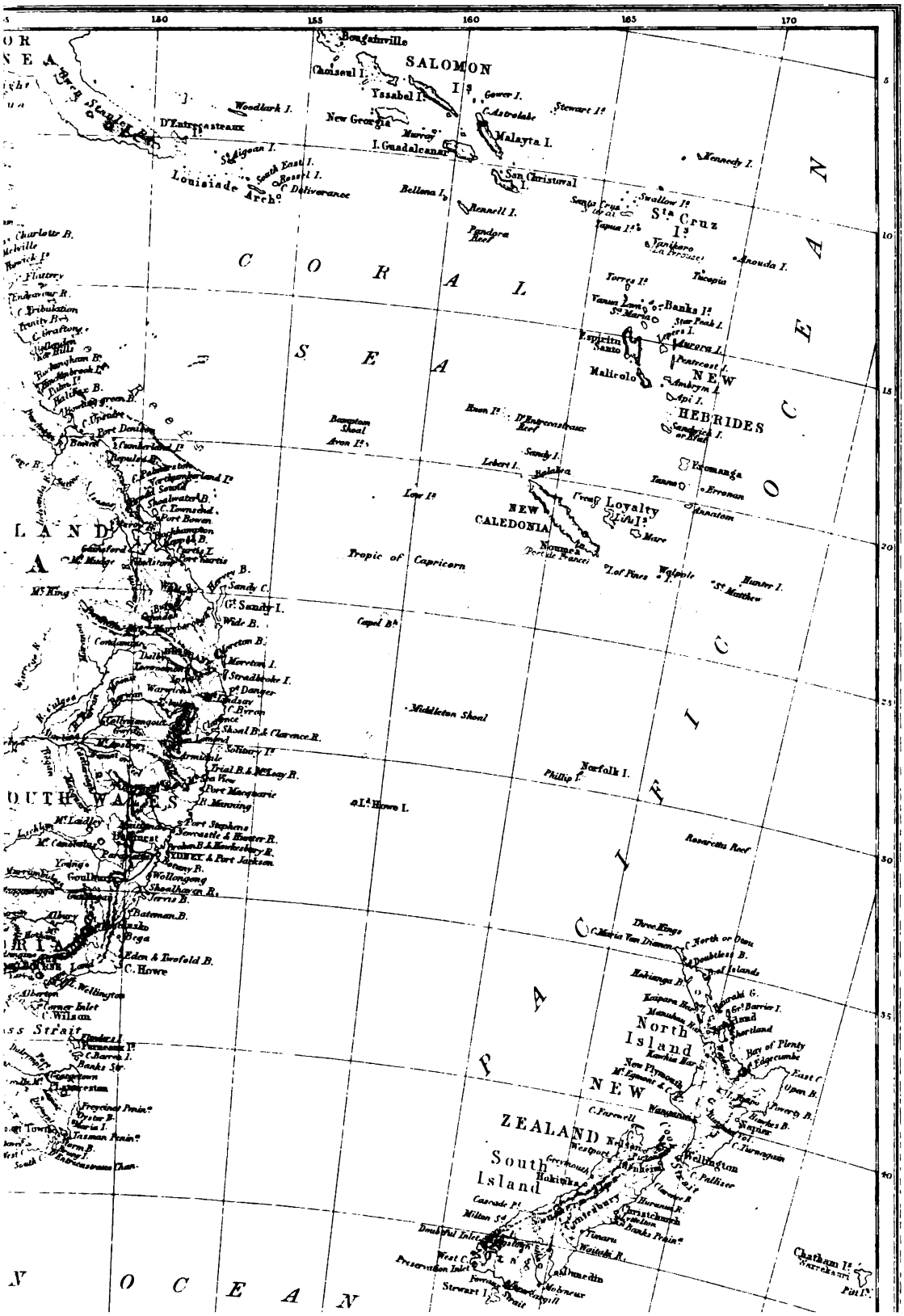
Lake Wallace
Lake Bolac
Lake Learmonth
Lake Wellington
Lake Reeve
Lake Victoria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SALOMON Is
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Ysabel I.
New Georgia
Malayta I.
I. Guadalcanar
Woodlark I.
D'Entrecasteaux
Louisiade Arch.
Deliverance
Bellona I.
Rennell I.
San Christoval I.
Santa Cruz Is
Swallow Is
Pandora Reef
Torres Is
Banks Is
Vanua Lava
Espiritu Santo
Malicolo
NEW HEBRIDES
Aurora I.
Pentecost I.
Ambrym I.
Api I.
Sandwich I.
Bampton Shoal
Aven Is
Lebert I.
Sandy I.
Low Is
NEW CALEDONIA
Loyalty Is
Mare
Erromanga
Tanna
Tropic of Capricorn
Middleton Shoal
Norfolk I.
Phillip I.
Lord Howe I.
Capel Bk
Sandy C.
Wide B.
Moreton I.
Stradbroke I.
Byron
Hunter I.
St Matthew
Three Kings
North Island
New Plymouth
Mt Egmont
Cape Farewell
Wellington
C. Palliser
South Island
Hokitika
Greymouth
Westport
Nelson
Cook Str.
Christchurch
Banks Peninsula
Timaru
Waitaki R.
Dunedin
Bluff Harbour
Foveaux Strait
Stewart I.
Chatham Is
Pitt I.
AUSTRALIA
NEW ZEALAND
CORAL SEA
TASMAN SEA
PACIFIC OCEAN
INDIAN OCEAN

turbations of our moon, and thus discovered the true theory of the secular equation, or rather of that vast cycle in which the lunar revolutions are alternately accelerated and retarded. During this discussion he demonstrated that the attractive force or gravity must be transmitted 50,000,000 times faster than light, which travels at the rate of 200,000 miles in a second. We may therefore consider it as quite instantaneous. This conclusion is important, because it sets aside all mechanical attempts to explain gravitation by the interposition of an ether, &c., and demonstrates it to be a principle ordained by the wisdom of the Supreme Architect. Laplace, continuing his researches, at last discovered that the secular equation of the moon affecting her mean motion, and that of her perigee and her nodes, in the ratio of 4, 12, and 3, is produced by the slow variation of the solar attraction, occasioned by the changing eccentricity of the earth's orbit, resulting from the influence of the larger planets, though they cannot alter the great axis which determines the mean periodic revolution.

In 1785 he proved that Jupiter and Saturn can have no secular equations. But remarking that their mean periods are commensurable, and very nearly as 2 to 5, he found their reciprocal acceleration and retardation to follow the same ratio. The cycle began in 1560, and comprehends 929 years. So that in 1750 Saturn had his period shortened 48′ 44″; while that of Jupiter was lengthened by 19′ 28″. In 1788 he discovered two curious laws that connect the periods of Jupiter's satellites, and gave a complete theory of their motions, which served as the basis of Delambre's excellent tables. In 1808 Lagrange gave a general solution of the problem of disturbing forces, and reduced his equations into a form of the utmost simplicity and elegance.

4. *Lunar and Solar Parallaxes.*—The nearest celestial bodies are seen from the surface of the earth in a position somewhat different than if viewed from the centre. This difference, called *parallax*, is obviously greatest at the horizon, and diminishes constantly as we approach the zenith. To ascertain parallax, therefore, with tolerable precision, observations must be made at distant stations. Lacaille selected the Cape of Good Hope, where he determined the mean parallax of the moon to be 57′ 39″. The parallax of the sun, being very small, is more difficult to determine. Kepler had made it a minute. Halley estimated it at 25″; but succeeding astronomers had reduced it to 10″. Halley proposed a very ingenious method of determining it with accuracy from the next transit of Venus, by measuring the acceleration of the time of her passage over the disk of the sun, as viewed from remote points on the surface of the globe. Aware that his own life would not be prolonged till that event took place, he warmly exhorted his successors to prepare themselves for observing it on the 5th of June, 1761. Astronomers were accordingly despatched by the maritime powers of Europe to all the stations that were considered as most accessible and eligible, but the result did not answer their expectation; some of the stations were not well chosen, some of the most expert astronomers had not reached the station assigned them, while others were prevented from observing by the state of the weather. Pingré deduced a parallax of $10\frac{1}{2}''$, while Short made it only $8\frac{1}{2}''$. The uncertainty was finally removed by the numerous and skilful observations of the transit of the 3d of June, 1769. The several results differed scarcely a quarter of a second, and their concurrence fixed the parallax at 8″·6. This agrees with the theoretic calculations of Laplace from the lunar anomalies. Bessel, with immense labour, combined and recomputed the original observations, and detected a small inaccuracy, the correcting of which reduces the parallax to 8″·575. Consequently the mean distance of the sun is 95,158,440 English miles.

5. *Discovery of Uranus.*—Dr. Herschell, who had devoted himself to the construction of telescopes, and to an indefatigable observation of the heavens, announced to Dr. Maskelyne that on the night of the 13th of March, 1781, he observed a shifting star, which from its smallness he judged to be a comet, though it was distinguished neither by a nebulosity nor by a tail. The motion of the star was so slow as to require distant observations to ascertain its path. It was for several months presumed to be a comet; but the hypothesis of a parabolic orbit led to very discordant results. The president Sharon was the first who conceived it to be a planet, having inferred from the observations communicated to him that it described a circle with a radius about twelve times the mean distance of the earth from the sun. Lexell, before the end of the year, had computed the elements of the new planet with considerable accuracy, making the great axis of its orbit nineteen times greater than that of the earth, and the period of its revolution eighty-four years. Bradley, mistaking it for a fixed star, had observed it on the 3d of December, 1753, and it was again seen by Mayer on the 23d of September, 1756.

Herschell gave this new planet the name of the Georgium Sidus; but the term *Uranus*, applied to it by Bode, is almost universally adopted. Herschell discovered the satellites of this planet, said to be six in number. They revolve

in a plane nearly perpendicular to the orbit of the planet, and contrary to the order of the signs. Both these primary and secondary bodies obey in their revolutions the laws of Kepler. The same remark applies to the satellites of Saturn, which Herschell increased to seven.

6. *Discovery of four new Planets.*—Kepler was of opinion that the harmony of our system wanted a planet between Mars and Jupiter. A similar notion was entertained by Lambert, who thought it likely that such a planet might exist, though it was dark and invisible. The distances of the planets from the sun may be denoted by the series 4, 7, 10, 16, 28, 52, 100; which numbers are convertible into English miles by multiplying by 9½ millions. The dark or deficient planet corresponds to twenty-eight, or a distance of 266,000,000 of miles from the sun.

In the place assigned to this dark planet four very small bodies have been discovered, which some persons have conjectured to be only fragments dissevered from the principal, and that other similar fragments may still remain undiscovered. The discovery of these very small planets distinguished the commencement of the present century. Piazzi discovered Ceres at Palermo, on the 1st of January, 1801; Olbers discovered Pallas at Bremen, on the 28th of March, 1802; and Harding observed Juno on the 2d of September, 1804, and Vesta on the 29th of March, 1807. These small bodies differ from the other planets, not only by their diminutive size, but by the remarkable inclination of their orbits to the plane of the ecliptic; which, however, they intersect nearly in the same nodes.

7. *Extent of the Universe.*—Herschell, by means of his excellent reflecting telescopes, employed himself assiduously in observing the numerous clusters of nebulosities, and distinguished many of the changing and double stars; which, though suns of other systems, yet appear connected, and may probably circulate about their common centre of gravity. The subject has lately been carried a great deal further by Sir James South and Sir John Herschell, the latter of whom proceeded to the Cape of Good Hope to examine the double stars of the southern hemisphere.

Sir William Herschell assuming that the instrument which he used could enable him to penetrate 497 times farther than Sirius, he reckoned 116,000 stars to pass in a quarter of an hour over the field of view, which subtended an angle of only 15′. If we compute from such a narrow zone, the whole celestial vault must display, within the range of telescopic vision, the stupendous number of more than five billions of stars. If each of these be a sun to a system similar to ours, and if the same number of planets revolve round it, then the whole planets in the universe will be more than fifty-five billions, not reckoning the satellites, which may be much more numerous. What an unimportant portion of the universe is occupied by our earth, and how insignificant must its inhabitants, with all their cares, and pride, and vanity appear to that Almighty Being whose providence regulates and governs at once such a prodigious number of worlds, with all their innumerable inhabitants!

OPTICS.

The history of astronomy, the most perfect and the sublimest of all the sciences, has unavoidably extended itself to a considerable length. Optics is the next science in point of perfection. Like astronomy, it depends on observation, but is everywhere capable of the rigid application of mathematical calculation.

As light propagates itself in straight lines, it seems to offer itself spontaneously to the consideration of geometers. Euclid accordingly began the investigation at least fifty years before Archimedes had placed mechanics among the number of the mathematical sciences. Euclid only established two particulars:—1. That a point in any object is seen in the direction of a straight line from the eye to that object. 2. That when a point in an object is seen by reflection from a polished surface, the lines drawn from the eye and from the object to the point whence the reflection is made, are equally inclined to the reflecting surface. From a treatise on optics by Ptolemy, discovered some years ago in the King of France's library, it appears that many observations had been made on refraction, though the law followed had not been discovered.

About 1000 years after Ptolemy, or in the eleventh century, Alhazen wrote his treatise on optics. In it he solved a problem of very great difficulty, to find the point in a spherical speculum at which a ray coming from one given point shall be reflected to another given point. Alhazen was acquainted with the anatomy of the eye, though he did not fully understand the uses of the different parts. On seeing single with two eyes he made the very important remark, that when corresponding parts of the retina are affected we perceive but one image.

Roger Bacon, who lived in the thirteenth century, made a near approach to the knowledge of lenses, and their use in assisting vision. The date of the discovery of spectacles for assisting the sight may be carried back as far as 1313, but no farther. The inventor appears to have been a Florentine, called *Salvino degl' Armato.* He was of a patrician family. Maria Manni quotes the following inscription on his tomb, from an antiquarian author: *Qui diace (giace) Salvino d' Armato degl' Armati, Firenze invento de egl' Occhiali, anno* MCCCXVII.

Two centuries later Maurolicus appeared. He was acquainted with the crystalline lens of the eye, and formed a correct judgment of the defects of *short-sighted* and *long-sighted eyes.* Baptisto Porta, a Neapolitan, invented the *camera obscura* about the year 1560. The light was admitted through a small hole in the window-shutter of a dark room, and gave an inverted picture of the objects from which it proceeded on the opposite wall. A lens was not employed in the first construction of this apparatus, but afterwards used; and Porta went so far as to consider how the effect might be produced without inversion.

Kepler was the first person who explained the mechanical action of the eye in vision. He perceived the exact resemblance of this organ to the *camera obscura,* the rays entering the pupil being collected by the crystalline lens and the other humours of the eye into *foci* which paint on the *retina* the inverted images of external objects. The mind perceives these images and refers them at the same time to things without.

Antonio à Dominis, archbishop of Spalatro, was the first person who explained the production of the rainbow. Having placed a bottle of water opposite to the sun and a little above his eye, he saw a beam of light issue from the under side of the bottle, which acquired different colours in the same order and with the same brilliancy as the rainbow, when the bottle was a little raised or depressed. From comparing all the circumstances he perceived that the rays had entered the bottle, and that after two refractions from the convex part, and a reflection from the concave, they returned to the eye tinged with different colours, according to the angle at which the ray had entered. The book containing this discovery was published in 1611.

The telescope was invented about this time, but somewhat earlier. The honour of the discovery belongs to Middleburg, in Zealand. Two different workmen, Zachariah Jans and John Lapprey, have each testimonies in their favour, between which it is difficult to decide. The former goes back to 1590, the latter comes down to 1610. Zachariah Jans was an optician in Middleburg, and Boreel has published a letter from his son assigning 1590 as the date of the invention, and another from his sister, assigning 1610 as the date. From the account of Boreel it would appear that Jans was the real inventor, and that the discovery of the telescope had been preceded by that of the microscope. News of this discovery was communicated to Galileo in 1610. He immediately constructed a telescope, turned it to the heavens, and made the interesting discoveries which have been already particularized.

The theory of the telescope required that the law of refraction should be discovered. This discovery was the work of Snellius, a mathematician of the Low Countries. To express this law he supposed a perpendicular to the refracting surface, at the point where the refraction is made, and also another line parallel to this perpendicular at any given distance from it. The refracted ray, as it proceeds, will meet this parallel, and the incident ray is supposed to be produced till it do so likewise. Now the general truth which Snellius found to hold, whatever was the position of the incident ray, is that the segments of the refracted ray and of the incident ray, intercepted by these parallels, had always the same ratio to each other.

In the triangle formed by the two segments of the rays, and by the parallel which they intersect, the said segments have the same ratio with the sines of the opposite angles; that is, with the sines of the angles of incidence and refraction. The law therefore comes to this, that in the refraction of light by the same mediums, the sine of the angle of incidence has to the sine of the angle of refraction always the same ratio. It was first stated in this way by Descartes in his Dioptrics, in 1637. But Snellius' law, which comes to the same thing, had been publicly taught in his lectures by Professor Hortensius, and must therefore have been known to Descartes.

Descartes next entered upon an inquiry, in which he was successful. In ordinary cases of refraction, by spherical and other surfaces, the rays are not collected into one point, but have their foci spread over a certain surface, the sections of which are the curves called caustic curves. The focus of opticians is only a point in this surface, where the rays are more condensed, and of course the illumination more intense than in other parts of it. But if refraction is to be employed either to produce heat or light, it would be a great advantage to have all the rays which come from the same point of an object united accurately after refraction, in the same point of the image. This led Descartes to

inquire into the figure which the superficies separating two transparent media of different refracting powers must have, that all the rays diverging from a given point might by refraction at the said superficies be made to converge to another given point. He showed that curves proper for generating such superficies by revolution have always two given points from which, if straight lines be drawn to any point in the curve, the one of these, plus or minus, that which has a given ratio to the other, is equal to a given line. When the given ratio is one of equality, the curve is a conic section, and the two points its foci. The curves in general are of the fourth or second order, and have been distinguished by the name of the ovals of Descartes.

But no practical advantage has resulted from this investigation. The mechanical difficulties of working a surface into any figure but a spherical one are so great that they have never been overcome.

The next improver of optics was James Gregory, whose Optica Promota appeared in 1663. It contained an account of his reflecting telescope. The imperfection of the images formed by spherical lenses led him to substitute reflection for refraction in the construction of the telescope. Gregory thought it necessary that the specula should have a parabolic figure; and the execution proved so difficult that the instrument during his lifetime was never brought to any perfection. After his death the specula were constructed of the ordinary spherical form, and the Gregorian telescope, till the time of Herschell, was more in use than the Newtonian. It is curious that, though the Optics of Descartes had been published twenty-five years, Gregory was ignorant of the law of refraction, and found it out by his own unassisted exertions.

Barrow's lectures on optics, delivered at Cambridge in 1668, treated of all the more difficult questions which had occurred in the then state of the science, with the acuteness and depth which are found in all his writings.

About this time the Jesuit Grimaldi made known some optical phenomena which had hitherto escaped detection. Having stretched a hair across a sunbeam, admitted through a hole in the window-shutter of a dark chamber, he was surprised to find the shadow much larger than the natural divergence of the rays could have led him to expect. Other facts of the same kind made known the general law of the *diffraction* or *inflection* of light, and showed that the rays are acted on by bodies, and turned out of their rectilinear course, even when not in contact, but at a measurable distance from the surfaces or edges of such bodies. Grimaldi gave an account of these facts in a treatise printed at Bologna in 1665.

The Dioptrics of Huygens, though a posthumous work, was the production of his early youth, and is said to have been a favourite book with Newton himself. It contains a full development of everything relating to the construction of telescopes, particularly in that which concerns the indistinctness arising from the imperfect foci into which rays are united by spherical lenses. Rules are deduced for constructing telescopes, which, though of different sizes, shall have the same degree of distinctness, &c. Huygens was a practical optician; he constructed telescopes with his own hands, and some of his object-glasses were of the enormous focal distance of 130 feet.

His theory of light was communicated to the Academy of Sciences of Paris in 1678, and afterwards published with enlargements in 1690. Light, according to him, consists of certain undulations communicated by luminous bodies to the etherial fluid which fills all space. This fluid is composed of the most subtile matter, is highly elastic, and the undulations are propagated through it with great velocity in spherical superficies, proceeding from a centre. The ingenuity of the theory appears most conspicuous in the explanation which it affords of the constant ratio which subsists between the sines of the angles of incidence and refraction in the same medium. But the happiest application of all, is to the explanation of the double refraction of Iceland crystal, or transparent calcareous spar. This crystal has not only the property of refracting light in the common manner of glass, water, and other transparent bodies; but it has also another power of refraction, by which even the rays falling perpendicularly on the surface of the crystal are turned out of their course, so that a double image is formed of all objects seen through these crystals. This property is not confined to calcareous spar; but belongs, in a greater or less degree, to all substances which are both crystallized and transparent.

The common refraction is explained by Huygens on the supposition that the undulations in the luminous fluid are propagated in the form of spherical waves. The double refraction is explained on the supposition that the undulations of light, in passing through the calcareous spar, assume a spheroidal form; and this hypothesis, though it does not apply with the same simplicity as the former, yet admits of such precision, that a proportion of the axes of the spheroides may be assigned which will account for the precise quantity of the extraordinary refraction, and for all the phenomena dependent

on it, which Huygens had studied with great care, and had reduced to a small number of general facts.

To render the theory of Huygens quite satisfactory, a reason ought to be assigned why the undulations of the luminous fluid are spheroidal in the case of crystals, and spherical in all other cases. This would render the generalization complete. But till a connection is clearly established between the structure of crystallized bodies and the property of double refraction, the theory must remain imperfect.

We now come to the discoveries of Newton, which constitute nearly as important an era in optical science as his theory of universal gravitation did in astronomy. His researches began in 1666, when he was only twenty-three years of age.

In hopes of improving the telescope, by giving to the glasses a figure different from the spherical, he had procured a glass prism, in order, as he tells us, to try with it the *celebrated phenomena of colours*. These trials led to the discovery of the different refrangibility of the rays of light, now too well known to require to be particularized.

Having admitted a ray of light into a dark chamber through a hole in the window-shutter, and made it fall on a glass prism, so placed as to cast it on the opposite wall, he was delighted to observe the brilliant colouring of the sun's image, and not less surprised to observe its figure, which, instead of being circular, was oblong in the direction perpendicular to the edges of the prism, so as to have the shape of a parallelogram, rounded at the two ends, and nearly five times as long as it was broad.

When he reflected on these appearances, he saw nothing that could explain the elongation of the image but the supposition that some of the rays of light, in passing through the prism, were more refracted than others; so that the rays which were parallel before they fell on the prism, being some of them more refracted than others, diverged from one another after refraction, the rays that differed in refrangibility differing also in colour. The *spectrum* would thus consist of a series of circular images, partly covering one another, and partly projecting one beyond the other, from the *red*, or least refrangible ray, in succession to the *orange*, *yellow*, *blue*, *indigo*, and *violet*, the most refrangible of all.

But he did not adopt this as the true explanation till he had tried every other hypothesis by the test of experiment, and proved its fallacy. Even after these rejections, his explanation had still to abide the sentence of an *experimentum crucis*.

Having admitted the light, and applied the prism as before, he received the coloured spectrum on a board about 12 feet distant from the prism, and pierced with a small hole. The coloured light which passed through this second hole was made to fall on a prism, and afterwards received on the opposite wall. It was then found that the rays which had been most refracted by the first prism were also most refracted by the second, though no new colours were produced. It was also observed that when the rays which fell on the second prism were all of the same colour, the image formed by refraction was truly circular, and of the same colour with the incident light.

When the sun's light is thus admitted, first through one aperture and then through another at some distance from the first, and is afterwards made to fall on a prism, as the rays come only from a part of the sun's disk, the spectrum has nearly the same length as before; but the breadth is greatly diminished; in consequence of which the light at each point is purer, it is free from penumbra, and the confines of the different colours can be more accurately traced. It was in this way that Newton measured the extent of each colour; and taking the mean of a great number of measurements, he assigned the following proportions, dividing the whole length of the spectrum, exclusive of the rounded terminations, into 360 parts. Of these the

Red occupied	45
Orange	27
Yellow	48
Green	60
Blue	60
Indigo	40
Violet	80

Newton conceived that there was an identity between these numbers and the divisions of the monochord, by the notes of music. But it has been since observed that the spaces occupied by these colours differ according to the kind of prism employed. Hence the relation was merely accidental.

Thus colours were found to be original properties of light, connected with the different degrees of refrangibility belonging to the different rays. Each of these colours, though primary, may be produced by a mixture of the two colours upon either side of it in the prism. Red and yellow make orange; yellow and blue make green; and so on. In general two colours not very far distant in the natural series, when mixed, make up the intermediate colour. All of them together constitute whiteness. Natural bodies of whatever colour, if viewed by simple and homogeneous light, are seen of the colour of that light and no other.

Thus supplied with so many new and accurate notions respecting colours, it was natural for Newton to apply them to explain the rainbow. Everything respecting that beautiful phenomenon had been already explained except the colours. As these colours were the same as in the solar spectrum exhibited by the prism, and in the same order, it could hardly be doubted that they were owing to the same cause. He showed this to be the case by calculating the extent of the arch, the breadth of the coloured bow, the position of the secondary bow, its distance from the primary, and by explaining the inversion of the colours.

As all colour comes from the rays of light, we must conclude that the colour of every particular body is owing to its reflecting the particular kind of ray of which it exhibits the colour. If you cast upon a coloured body a homogeneous ray of light, it appears much more vivid, that is, it reflects much more light, when the ray cast upon it is of its own colour. Transparent bodies sometimes reflect one kind of ray, and transmit another.

But here a difficulty occurs. Suppose a body to reflect red or green light, what is it that decomposes the light, and separates the red or the green from the rest? It was this difficulty that led Newton to study the colours produced by light passing through thin plates of any transparent substance. When two transparent bodies, such as pieces of glass having their surfaces somewhat convex, are pressed together, a black spot is formed at the contact of the two, which is surrounded with coloured rings more or less regular, according to the form of the surfaces. To analyze this phenomenon Newton made experiments with surfaces of a regular curvature, capable of being measured. He took two object-glasses, one a plane convex for a 14 feet telescope, the other a double convex for one of about 50 feet, and upon this last he laid the other, with its plane side undermost, pressing them gently together. At their contact in the centre was a pellucid spot, through which the light passed without suffering any reflection. Round this spot was a coloured ring, exhibiting blue, white, yellow, and red. This was succeeded by a pellucid or dark ring; then a coloured ring of violet, blue, green, yellow, and red, all copious and vivid except the green. The third coloured ring consisted of purple, blue, green, yellow, and red. The fourth consisted of green and red; those that succeeded became gradually more dilute, and ended in whiteness. It was possible to count as far as seven.

The colours of these rings were so marked by peculiarities in shade and vivacity, that Newton considered them as belonging to different orders; so that an eye accustomed to examine them, on any particular colour of a natural object being pointed out, would be able to determine to which order in this series it belonged.

Thus we have a system of rings or zones surrounding a dark central spot, and themselves alternately dark and coloured; that is, alternately transmitting the light, and reflecting it. It is evident that the thickness of the plates of air interposed between the glasses, at each of those rings, must be a material element in the arrangement of this system. Newton, therefore, undertook to compute their thickness. Having carefully measured the diameters of the first six coloured rings at the most lucid part of each, he found their squares to be as the progression of the odd numbers 1, 3, 5, 7, &c. The squares of the distances, from the centre of the dark spot to each of these circumferences, were therefore in the same ratio; and, consequently, the thickness of the plates of air, or the intervals between the glasses, were as the numbers 1, 3, 5, 7, &c. When the diameters of the dark or pellucid rings, which separated the coloured rings, were measured, their squares were found to be as the even numbers 0, 2, 4, 6; and, therefore, the thickness of the plates, through which the light was wholly transmitted, were as these numbers.

The curvature of the convex glass being the thickness of the plates of air which corresponded to the different rings, was computed. An inch being divided into 178,000 parts, the thickness of the air for the first series, or for the luminous rings, was $\frac{1}{178000}$, $\frac{3}{178000}$, $\frac{5}{178000}$, &c., inch. For the second series $\frac{2}{178000}$, $\frac{4}{178000}$, &c., inch.

When the rings were examined, by looking through the lenses in the opposite direction, the central spot appeared white, and in other rings red was opposite to blue, yellow to violet, and green to a compound of red and violet—the colours formed by the transmitted and reflected light being what are now called complementary, or nearly so, of one another; that is, such as when mixed produce white.

When the fluid between the glasses was different from air, as when it was water, the succession of rings was the same; the only difference was, that the rings themselves were narrower.

When experiments were made on thin plates in such a way that the plate was denser than the surrounding medium, as in the case of soap-bubbles, the same phenomena were observed to take place.

To the different degrees of density, then, in transparent bodies, there seemed to be attached the powers of separating particular colours from the mass of light, and of rendering them visible sometimes by reflection, and in other cases by

transmission. Now, as there is reason to think that the atoms of bodies are transparent, they may be conceived to act on light after the manner of thin plates, and to produce, each according to its thickness and density, its appropriate colour, which therefore becomes the colour of the surface.

But these experiments led to other conclusions new and unexpected. It was impossible to observe without wonder the rings, alternately luminous and dark, that were formed between the two plates of glass in the preceding experiments, and determined to be what they were by the different thickness of air between the plates, and having to that thickness the relation already specified. A plate, of which the thickness was equal to a certain quantity multiplied by an odd number, gave always a circle of the one kind; but when the thickness was the same quantity multiplied by an even number, the circle was of another kind; the light, in the first case, being reflected; in the second, transmitted.

Light penetrating a thin transparent plate, of which the thickness was m, 3 m, 5 m, &c., was decomposed and reflected; the same light penetrating the same plate, but of the thickness 0, 2 m, 4 m, &c., was transmitted, though in a certain degree also decomposed. The same light, therefore, was transmitted or reflected according as the second surface of the plate of air, through which it passed, was distant from the first, by the intervals 0, 2 m, 4 m, or m, 3 m, 5 m; so that it became necessary to suppose the same ray to be successively disposed to be transmitted and to be reflected at points of space separated from one another by the same interval m. This constitutes what Newton called *fits of easy transmission and easy reflection*. It constitutes one of the most singular parts of his optical discoveries. It is a necessary inference from the phenomena; and though the cause cannot be assigned, it must, notwithstanding, be admitted as a general fact, which enables us to explain various phenomena that were unknown at the time when Newton lived.

Newton's explanation of refraction proceeds on the theory that light is an emanation of particles moving in straight lines with incredible velocity, and attracted by the particles of transparent bodies. When, therefore, light falls obliquely on the surface of such a body, its motion may be resolved into two: one parallel to that surface, and the other perpendicular to it. Of these the first is not affected by the attraction of the body, which is perpendicular to its own surface; and, therefore, it remains the same in the refracted as it was in the incident ray. But the velocity perpendicular to the surface is increased by the attraction of the body; and whatever be the quantity of that velocity, its square on entering the same transparent body will always be augmented by the same quantity. But it is easy to demonstrate, that if there be two right-angled triangles, with a side in the one equal to a side in the other, the hypotenuse of the first being given, and the squares of their remaining sides differing by a given space, the sines of the angles opposite to the equal sides must have a given ratio to each other. This amounts to the same thing with saying that, in the case before us, the sine of the angle of incidence is to the sine of the angle of refraction in a given ratio. This explanation of the law of refraction is so satisfactory, that it affords a strong argument in favour of the system which considers light as an emanation of particles from luminous bodies.

Huygens, indeed, deduced from the hypothesis of the vibrations of an elastic fluid an explanation of refraction which is highly ingenious, but not quite so satisfactory as the Newtonian; though it be the fashion at present to give a preference to the hypothesis of Huygens, we think that very solid objections might be started against it, were this the proper place for such an attempt.

The square that is added to that of the perpendicular velocity of light, in consequence of the attractive force of the transparent substance, is properly the measure of the quantity of that attraction, and is the same with the differences of the squares of the velocities of the incident and the refracted light. This is readily deduced from the ratio of the angle of incidence to that of refraction. When this is done for different substances, it is found that the above measure of the refracting power of different bodies is nearly proportional to their densities, with the exception of those which contain much combustible matter, which is always accompanied by an increase of refracting power.

Thus the refracting power (ascertained in the way just mentioned), when divided by the density, gives quotients not very different from one another, till we come to combustible bodies, when a great increase immediately takes place. In air, for instance, the quotient is 5208, in rock-crystal 5450, in common glass nearly the same; but in spirit of wine, oil, and amber, the same quotients are 10121, 12607, 13654. In the diamond he found the quotient 14556. Hence he conjectured that the diamond was, at least in part, a combustible body. The refracting power of water being great for its density, its quotient being 7845, he concluded that an inflammable substance enters into its composition—a conjecture which was verified nearly a century afterwards by the synthetical experiments of Mr. Cavendish.

The reflection of light from the surfaces of opaque bodies, and from the anterior surfaces of transparent bodies, appears to be produced by a repulsive force exerted by those surfaces, at a determinate but very small distance; in consequence of which there is stretched out over them an elastic web, through which the particles of light, notwithstanding their incredible velocity, are not always able to penetrate. In the case of a transparent body, the light which when it arrives at this outwork is in a *fit* of easy reflection, is reflected back again. The particles, on the other hand, which are in a state that disposes them to be transmitted, overcome the repulsive force, and entering the transparent body, are attracted and refracted as already explained. If these rays reach the second surface of the transparent body with a certain obliquity, the attraction will not suffer the rays to emerge into the rarer medium, but will force them to return back into the transparent body. Thus the reflection of light, at the second surface of a transparent body, is produced not by the repulsion of the medium into which it is about to enter, but by the attraction of that which it was going to leave.

In consequence of these discoveries Newton perceived a defect in the refracting telescope, proceeding from the unequal refrangibility of the different rays. This defect he was of opinion it was impossible to remedy, because he thought that the quantity of the refraction and of the dispersion in different substances bore always the same ratio to each other. Had this been so, the appearance of prismatic colours in a refracting telescope could never have been cured without destroying the refraction altogether. But this was one of the few points about which Newton was mistaken. The mistake was afterwards discovered by Dollond, who found that, by means of crown and flint glass, the dispersion might be counteracted without injuring the refraction. This great discovery enabled him prodigiously to improve the refracting telescope; and they are now reckoned so much preferable, that they are superseding the reflecting telescope altogether.

Newton turned his attention also to the inflection of light. He found that the ray, in passing the knife-edge, had been both attracted and repelled, and that it had begun to be acted on at the distance of $\frac{1}{100}$th of an inch from the edge of the knife. The path of the ray, in passing the knife-edge, was bent in opposite directions, so as to form a serpentine line, convex and concave, towards the knife, according to the repulsive or attractive forces which acted at different distances. In his opinion the refraction, reflection, and inflection of light are all produced by the same force differently modified, and do not arise from the collision of light with the particles of bodies.

The great improver of achromatic telescopes after Dollond was Fraunhofer. He observed, in examining the different-coloured rays of the spectrum by means of a telescope, that though the coloured spaces appear not parted by any distinct boundaries, yet they are broken and subdivided by numerous white and black lines. He reckoned altogether above 600 lines; a few occur in the red; but they are numerous in the orange, yellow, green, and blue. A stripe, opened by a fine white line, divides the red; other stripes emerge at intervals between the orange and the blue, and two very broad approximating bars cross the violet. Other glass prisms, and even those filled with liquids, gave similar appearances. It would appear from this that refraction proceeds by irregular bounds, somewhat like Newton's easy fits of transmission and reflection.

We shall finish this hasty sketch of optics with noticing the discovery of what is called *polarized rays of light* by Malus, a French officer of engineers. The double-refracting property of Iceland-spar, which had been so carefully examined by Huygens, drew also the attention of Newton, who concluded that the ray which suffers the *unusual* or *extraordinary* refraction must have its opposite sides affected by some virtue like magnetism, which gives them a tendency to polarity. This remark lay neglected for almost a century. Malus had early turned his attention to the more difficult problems in optics; and, after his return from foreign service, he resumed his favourite studies. In one of his frequent visits to the observatory, during his residence in Paris in the summer of 1809, he was struck with the brilliant reflection of the setting sun from one of the windows of the Luxembourg Palace. On looking at the appearance through a prism of rock-crystal which he slowly turned round, he remarked with surprise that one of the images changed regularly to brightness from obscurity. Next morning he repeated his observation with the same results; and soon found that light, reflected at a certain angle from the surface of glass, acquires the same character as the extraordinary ray in the double-refracting prism. Water showed a similar disposition, but at a different angle of incidence. The law was traced through various reflecting surfaces, and Malus was prosecuting the subject with rapid success when his career was cut short by a lingering disease on the 23d of February, 1812. The subject of polarization has been successfully prosecuted in this country by Herschell and Brewster; and on the Continent

by Biot, Arago, and Fresnel; but much still remains before it reaches the simplicity which characterizes the other branches of optics.

HYDROSTATICS, &c.

The law which determines the weight of bodies immersed in fluids had been discovered by Archimedes, and likewise the position of bodies floating on them. It was ascertained by Stevinus that the pressure of fluids is proportional to their depth. These two propositions constitute the leading principles of hydrostatics.

Hydraulics, or the motion of fluids, is a much more difficult subject. The first step was made by Torricelli, who proved that water issues from a hole in the side or bottom of a vessel with the velocity which a body would acquire by falling from the level of the surface to the level of the orifice. This proposition, which constitutes the leading principle of hydraulics, was published at the end of Torricelli's book De Motu gravium et projectorum.

We owe to Torricelli another discovery no less important. The question had been put to Galileo, why water will rise in a pump to the height of 33 feet, but no further. This question he was unable to answer — though it could not but be obvious from it that the reason assigned by the ancients for the rise of water in a pump, namely, nature's abhorrence of a vacuum, could not be the true one. Torricelli reflecting on the subject, conceived that if a heavier fluid than water were used, a vacuum might be produced in a much shorter tube. He filled a glass tube 3 feet long, open at one end and shut at the other, with mercury, and covering the open end with his finger, immersed it in a basin of mercury. The result is universally known. He found the mercury suspended in the tube to the height of about 30 inches; an effect which he ascribed to the pressure of the atmosphere. It was easy to see that the rise of water in pumps was owing to the same cause.

The objections made to this explanation were removed by carrying a barometer to the top of the Puy de Dome, at the suggestion of Pascal. The mercury fell lower in the tube, because the pressure of the atmosphere was less at the top than at the bottom of the mountain.

The invention of the air-pump, by Otto Guericke, burgomaster of Magdeburg, quickly followed that of the barometer. To obtain a space entirely void of air, he filled a barrel with water, and having closed it exactly on all sides, began to draw out the water by a sucking-pump applied to the lower part of the vessel. He had proceeded but a little way when the air burst into the barrel with a loud noise. After various failures he at last procured a vacuum by employing a sphere of glass. This was about the year 1654. The air-pump was greatly improved by Mr. Boyle, assisted by Dr. Hook, who was his operator. For the sphere of Otto Guericke he substituted a more convenient receiver, and made the pump to work more easily, and produced a better vacuum.

Thus the elasticity, as well as the weight of the air became known. Boyle showed that water always contains air, and he placed the weight and elasticity of air in a variety of new lights.

When we measure the quantity of water discharged from a small hole in the bottom of a cylinder filled with that liquid, the efflux amounts only to about five-eighths of the first emission.

To explain this disagreement Newton had recourse to the supposition of a cataract or funnel-shaped conoid, by which the various streamlets bend their course to the orifice. The theory was first investigated by Daniel Bernoulli, in his treatise on hydrodynamics. It was discussed in 1744 and 1752 by D'Alembert, by Euler in 1755 and 1772, and by Lagrange in 1781. But these admirable analytical investigations have been found of very little utility in the practice of the science. The science is nearly in the state in which it was left by Newton; or at least for the progress which it has made it is rather indebted to the experimental investigations of practical men than to the abstract reasoning of mathematicians.

The principles of hydrostatics constitute the grounds of naval architecture, which embraces the theory of the construction and sailing of ships. Euler published an important work on the subject in 1749. Bouguer, who from his situation possessed much more experience, and was not deficient in mathematical skill, examined the subject in detail, and reduced the theory to a great deal of simplicity. In 1746 he demonstrated a very useful theorem. When a body floats on the surface of water, it is held in equilibrium by the action of two opposite and equal perpendicular forces, passing through its centre of gravity and its centre of *buoyancy* or that of the fluid displaced by its immersion. Its weight draws it downwards, while its buoyancy presses it directly upwards in the line of support; the vertical position of those centres being essential to floating, the centre of buoyancy does not remain stationary, but shifts with the inclination of the floating

body. The sustaining force may be conceived to act where the line of support crosses the axis. On this point Bouguer bestowed the name of *metacentre*. It is the limiting position, upon which the stability of floating depends. Whenever it stands above the centre of gravity there is stability; but not so when it is under that centre.

The most complete set of experiments on the resistance of water in narrow canals was made by Bossut between the years 1766 and 1775. He found that the celerity of water was reduced to one-tenth part by flowing through a smooth leaden pipe whose length is four thousand times its diameter—or that every particle of the fluid has its motion extinguished and renewed ten times during its passage along the pipe. If in this case the whole pressure were divided into 100 equal parts, one of those only generates the velocity, while ninety-nine parts are expended in merely surmounting the impediments to the flow.

Smeaton's experiments, by means of small models, in 1759, on the action of water and wind against the sails of mills, though made upon a very contracted scale, have been made generally to regulate practice. The experiments of Colonel Beaufoy were made with great care. But the most complete set are said to be those made at Fahlun between 1811 and 1815, by Lagerhjelm and Forselles. Their publication, which appeared in 1818, contains also many experiments on friction.

The resistance of fluids to bodies moving through them is partly occasioned by the accumulation of fluid before them, and partly by the dilatation and consequent partial vacuum produced behind the moving body. Both of these impediments increase at a great rate, according to the velocity. Robins first showed that when a body moves through air at a rate exceeding 1350 feet per second, a vacuum is formed behind it, and the body in consequence is retarded by a force equal to the whole pressure of the atmosphere. This pressure completely deranges the parabolic theory of the motion of cannon-balls. It explains also why the motion of a missile is very much affected by the shape of the posterior extremity.

Robins employed an ingenious method of determining the impulse of balls, by firing them against a heavy loaded pendulum, whose deflection indicated the momentum thus communicated. By intercepting the flight at different distances, he discovered the diminution of velocity, and consequently the effect produced by the resistance of the air. Dr. Hutton adopted the balistic pendulum in his extensive set of experiments made on Woolwich Common during the years 1790 and 1791. It comprehended the whole range of velocities from 5 feet in a second to 2000. The resistance was found to increase in a greater ratio than that of the square of the velocity.

Coulomb showed by his balance of torsion, that when the motion is very slow, the resistance of fluids is proportional to the velocity simply. In rapid motions it would appear to increase as the square of the velocity. Probably when the motion is very rapid, the resistance may increase as the cube of the velocity. But this point has not yet been cleared up by a satisfactory series of experiments.

The flow of air through a small orifice suffers nearly the same loss as water, or delivers only about five-eighths of the measure indicated by theory. But when air passes through a long pipe, the obstruction seems to be considerably greater than happens to water in the same circumstances.

When different gases are made to pass through a small aperture by a given pressure, the time occupied by the various gases is precisely inversely as the square root of the specific gravity of the gases. Thus oxygen gas is sixteen times heavier than hydrogen gas; and a given bulk of hydrogen gas will pass through a given aperture, urged by the same pressure, in the fourth part of the time that the same volume of oxygen gas will take to pass.

One of the finest consequences drawn from the principles of pneumatics is the method of determining the height of mountains by means of barometrical observations. Boyle first observed that the *density of the air is always proportional to the pressure*. This was also announced by Mariotte in his work on the atmosphere, published in 1676; and in consequence is usually known in France by the name of *the law of Mariotte*. In 1685, Halley gave a geometrical demonstration, that the density of the atmosphere diminishes in a continued geometrical proportion, when the heights increase in an arithmetical proportion. For the sake of round numbers he assumed 30 inches for the standard mercurial column; air at the surface being 800 times less dense than water; and he made the elevation proportional to the difference of the logarithms of these columns; the interval between 30 and 29 inches corresponding to 900 feet. This rule, drawn directly from theoretical considerations, was found to apply with tolerable accuracy to an observation made a few years afterwards on the top of Snowdon. Newton generalized the principle in his Principia by taking into the estimate the decrease of gravity in receding from the earth, and arrived at the conclusion that the densities of the higher strata of the atmosphere form a geometrical

progression corresponding to altitudes disposed in harmonic proportion. But this correction, in most cases of barometrical measurement, is superfluous.

After this the subject fell asleep for almost half a century. Bouguer took the opportunity of his journey to Peru to compare theory with observation upon the grandest scale, by measuring the heights of the Cordilleras. His investigation was published in 1753, when he gave the very simple rule which is the ground of our present practice. *That the difference between the logarithms of the barometrical columns, reckoning as integers the first four figures, and deducting a thirtieth part, will express the altitude in toises.* To accommodate the result to English measure, it is only required to add, instead of subtracting, the thirtieth part of the logarithmic difference to denote fathoms.

Discrepancies still existed, which were first accounted for by Deluc, who showed that they were owing to the influence of heat on the density of the air. He corrected the defects in the construction of the barometer and thermometer, and determined the amount of the expansion which air undergoes when heated. The rules which he thence deduced were published in 1772 in his work entitled Recherches sur les Modifications de l'Atmosphere. In 1774 they were reduced to English measures, and simplified by Maskelyne and Horsley. General Roy computed and observed the heights of mountains in Wales and Scotland, and Sir George Shuckborough at the same time, and for the same purpose, ascended the Alps. Their conclusions very nearly agreed, making the difference between the logarithms of the mercurial columns to express the elevation in fathoms at a temperature only a fraction of a degree below the freezing-points.

Very little addition has been made to the data since 1777. A simple proportion given by the late Professor Leslie of Edinburgh, however, deserves to be stated, because it is easily remembered, and will enable us to calculate the heights even when we have not in our possession a set of logarithmic tables. It is this: As the sum of the mercurial columns is to their difference, so is the constant number 52,000 to the height. This number is more easily remembered from the division of the year into fifty-two weeks.

Something has been done of late years respecting *capillary attraction*, especially by Mr. Ivory, who has unravelled the intricate formula of Laplace by disjoining it into two separate portions; the one depending on the adhesion of the watery film to the inside of the tube, and the other resulting from half the cohesion of the particles of the liquid to each other. We refer the reader who wishes for information on this subject, to Mr. Ivory's masterly treatise on the elevation of fluids, published in the supplement to the fourth edition of the Encyclopædia Britannica.

ELECTRICITY.

This branch of science has been chiefly cultivated by experiment. It is, in consequence, full of interest, and exhibits many splendid and striking phenomena. The term is borrowed from the Greek name for amber, and was applied to a property which amber acquired when rubbed. It *attracted light bodies*, and afterwards *repelled* them. To this alternate attraction and repulsion the name *electricity* was given.

The first person who made any striking progress in the investigation of electricity was Stephen Gray, a pensioner of the Charterhouse. His first paper appeared in the Philosophical Transactions for 1720, and he continued to prosecute the subject till the year 1736, when he died. His great discovery was, that electricity is capable of passing with great rapidity through metals, animal bodies, green wood, and water; but not through those bodies which may be excited by friction, as glass, hair, silk, feathers, &c. Hence he divided all bodies, as far as electricity is concerned, into *conductors* and *non-conductors;* the former he could not excite by friction, the latter he could excite without difficulty. He found likewise, that when a conductor is surrounded by non-conductors, or *insulated*, as it is termed, electricity passes through it to any distance; but when it is in contact with conductors, that electricity is dissipated.

In the year 1733 M. Dufay, whose youth had been spent in the army, turned his attention to electricity, and speedily distinguished himself by three important discoveries. 1. He found that conductors may be excited as well as non-conductors, by friction, provided we use the precaution to insulate them before we begin to rub. It was from not attending to this necessary precaution that Mr. Gray had failed in exciting these bodies. 2. Electrical bodies, when excited, *attract* those that are not excited, communicate electricity to them, and repel them. 3. There are two kinds of electricity, which Dufay distinguished by the names of *vitreous* and *resinous*. The terms *positive* and *negative* are now usually applied to them. Bodies hav-

ing the *same* kind of electricity *repel*, those having *different* electricities *attract* each other. The reason why excited bodies attract light substances to themselves is that they produce in them the contrary electricity from what they themselves possess. Hence they are attracted in consequence of the general law that bodies having opposite electricities attract each other. Dufay died of the small-pox at the early age of forty-one.

In the year 1746 Cuneus, in company with Muschenbroeck and Allamand at Leyden, made an accidental discovery, which drew the attention and astonishment of the whole scientific world. Observing that electrified bodies, when exposed to the common atmosphere, soon lost their electricity, and were capable of retaining but a small quantity, these gentlemen imagined that if an excited body were terminated on all sides by electrics, it might be capable of receiving a stronger charge, and of retaining it a longer time. A gun barrel was suspended on silken strings, having one of its ends very near a glass globe, which was turned rapidly, while electricity was excited in it by friction with the hands. A wire was hung from the other end of the gun barrel, which dipped into a beer glass, full of water, and held in the hands of one of the gentlemen. After the globe had been driven for some time, the gentleman who held the beer glass applied his finger to the gun barrel to draw a spark from it. The consequence was a shock, differing in violence according to the length of time that the globe had been turned. Such was the origin of the famous Leyden-phial experiment, which at first excited universal astonishment and terror; but was very soon exhibited in London and Paris, and indeed in all the large cities of Europe, and drew crowds of spectators to witness the phenomena, and to feel the shock.

It was found that this shock could be given at once to any number of persons, provided they laid hold of each others' hands, and that every person (how great soever the number might be) received the shock at the same instant of time. Advantage was taken of this shock to determine the rate at which electricity moves. Dr. Watson made an electric discharge pass through 12,276 feet of wire. One gentleman held a charged Leyden-jar in one hand, and the extremity of the wire in the other. Another gentlemen held the other extremity of the wire in one hand, and with the other brought a short iron rod in contact with the knob of the Leyden-jar. The consequence was a discharge of electricity, and both the gentlemen received the charge at the same instant of time. So that electricity passes over a circuit of 2 miles instantaneously, or at least in an interval of time too short to be noticed. Indeed, in one of Dr. Watson's experiments, the circuit through which the electricity passed was nearly 6 miles in length, yet no sensible interval of time was taken up by it in this long extent through which it had to pass.

The first successful attempt to explain the phenomena of electricity was made by Dr. Franklin, in a series of letters addressed to Peter Colinson, Esq., from Philadelphia in America. These letters had been offered to the Royal Society, but were refused a place in the Transactions of that learned body. When they made their appearance in 1754 they drew universal attention, were almost immediately translated into all the European languages; and as if this had not been sufficient, they were ushered into the world in a Latin dress. Dr. Franklin conceived that only one electric fluid existed, and that all the phenomena of electricity were occasioned either by its accumulation in bodies in more than its natural quantity, or by its being withdrawn from bodies, so as to leave in them less than the usual quantity. When a body contains its natural quantity of electricity, it exhibits no electrical phenomena whatever. When electricity accumulates, the phenomena of the vitreous electricity of Dufay are exhibited. When electricity is deficient we perceive in it the phenomena of the resinous electricity of Dufay. Besides this theory, which probably occasioned his immediate celebrity, electricity is indebted to him for three capital discoveries.

1. Electricity is dissipated at a great rate by points, so that it is impossible to accumulate it in pointed bodies.

2. The second and greatest discovery of Dr. Franklin was, that lightning and thunder are occasioned by the accumulation of electricity in the atmosphere; or, in other words, that lightning is the same thing with electricity. The analogy between lightning and electricity had been pointed out already by the Abbé Nollet, and was generally admitted; but Dr. Franklin having discovered the power of pointed bodies to discharge electricity at a distance, first thought of employing that method to render atmospheric electricity sensible. Not having in America the requisite means for such an experiment, he requested the electricians in Europe to turn their attention to it. The first person who attended to the suggestion was M. D'Abelard, who constructed an apparatus for the purpose at Marly la Ville, about 6 leagues from Paris. It consisted of an iron rod 40 feet long, the lower extremity of which was brought into a sentry-box where rain could not enter; while

on the outside it was fastened to three wooden posts by silken strings defended from rain. M. D'Abelard was obliged to leave home; but in his absence he intrusted his machine to one Coisier, a joiner, who had served fourteen years among the dragoons, and on whose courage and understanding he could depend. This artisan had all the requisite instructions given him, and he was desired to call some of his neighbours, particularly the curate of the parish, whenever there should be any appearance of a thunder-storm. On Wednesday the 10th of May, 1752, between two and three in the afternoon, Coisier heard a pretty loud clap of thunder. Immediately he ran to the machine, taking with him a phial furnished with a brass wire; and presenting the wire to the end of the rod, a small spark issued from it with a snap, like that of a spark from an electrified conductor. Stronger sparks were afterwards drawn in the presence of the curate and a number of other people. The curate's account of them was that they were of a blue colour, an inch and a half in length, and smelled strongly of sulphur. In taking them Coisier received a stroke on his arm, a little below the elbow.

Dr. Franklin, after having published his views on the subject, was waiting for the erection of a spire in Philadelphia to execute his experiment, when it occurred to him that by means of a boy's kite he could have a readier and better access to the region of thunder than by any spire whatever. Preparing a large silk handkerchief and two cross sticks of sufficient length on which to extend it, he took the opportunity of the first approaching thunder-storm to take a walk into a field where there was a shade convenient for his purpose. He confided his secret to nobody but his son, who assisted him in raising the kite.

After the kite was raised a considerable time elapsed before it exhibited any marks of being electrified. One very promising cloud had passed without effect; when at length, just as he was beginning to despair of his contrivance, the rain having wetted the string, which was of hemp, and rendered it a better conductor, he observed some loose threads on it to stand erect and to avoid one another, just as if they had been suspended on a common conductor. Struck with this promising appearance, he presented his knuckle to the key which was tied to the end of the string, and the discovery was complete — he perceived a very evident electric spark. Others succeeded even before the string was fully wetted, so as to put the matter past all dispute; and when the rain had wetted the string, he collected sparks in abundance. This happened in June, 1752, about a month after the French electricians had verified the theory, but before any information on the subject had reached Dr. Franklin.

This experiment of Dr. Franklin was attended with extreme danger. Had his cord been more moistened, or a better conductor than it was, it is not unlikely that this celebrated man would have fallen a victim to his temerity. This actually happened soon after to Professor Richmann of Petersburg, who was struck dead by a flash of lightning on the 6th of August, 1753, drawn by his apparatus into his room, as he was attending to an experiment which he was making with it.

3. The third discovery of Dr. Franklin was the analysis of the Leyden-phial, which contributed more than anything else to establish his peculiar theory of electricity. The Leyden-phial, in its present state of simplicity, was the work of Watson and Nairn. It consists of a glass jar, of any size, narrower at the mouth, and coated within and without with tin-foil to within 2 or 3 inches of the mouth. The mouth has a piece of dry varnished wood fitted into it; through which there passes a wire having a knob on the top of it, which rises a few inches above the mouth, and which touches the tin-foil coating at the bottom of the jar in the inside. When the knob of this jar is presented to the prime conductor of an electrical machine sparks pass into it, and for every spark which passes into the inside of the jar there may be seen a corresponding spark passing between the outside coating and a metallic knob held near it. The inside of the jar is charged with positive electricity, and the outside with negative electricity. Whenever the inside and outside coating are brought into contact, as by holding the jar in one hand and touching the knob with the other, the two electricities rush into combination and an electric shock is felt.

The Franklinian theory was exhibited in a mathematical dress by Æpinus in 1759, and by Mr. Cavendish in 1771. The theory proceeds on the notion that only one electrical fluid exists, and that its particles repel each other, but are attracted by matter. But several of the hypotheses which they were obliged to assume are hardly admissible. Thus they were obliged to admit that matter repels matter, though of this repulsion no proof can be given. Neither are the phenomena of electricity consistent with the notion that an affinity exists between matter and electricity. For it has been ascertained that electricity is entirely confined to the surface of bodies, and never penetrates into the interior; a fact which appears inconsistent with any such affinity.

In 1779 a highly important work on electricity

was published by Lord Mahon, afterwards Earl of Stanhope. In this work the author enters at large into the doctrine of *electric atmospheres*. He showed, as had been previously done by Mr. Canton, that the air in the neighbourhood of a charged conductor gradually acquires the same kind of electricity with the conductor, and that the intensity of this state varies inversely as the square of the distance from the conductor.

In the same work he explained the nature of what he called the *returning stroke*. When an excited body is brought into the neighbourhood of another body, the equilibrium of the electricity in that body is disturbed. Let the first body be charged with positive electricity; the extremity of the second body next it will become *negative*, in consequence of the positive electricity of the first body attracting the negative of the second and repelling the positive, which last will accumulate in the farthest extremity of the second body. When matters are in this state, let the surplus electricity be discharged from the first body by touching it with a conductor. The positive electricity which had accumulated at the farthest extremity of the second body will now return and spread itself equally over the whole body. The same will happen to the negative electricity, which had accumulated in the end nearest the first body. It is to this return, or new distribution of the electricity, that Lord Stanhope gave the name of *returning stroke*. Suppose a large cloud charged with positive electricity, and that one end approaches within a certain distance of the earth. That part of the earth nearest it will become negative. The negative electricity will accumulate, and the positive will be repelled to a distance. Let the electricity be suddenly discharged from the cloud, the positive electricity will return back to the part of the earth below the cloud with impetuousity, while the negative electricity will recede with equal velocity. Hence it may happen that animals may be destroyed by such a returning stroke, even when no thunder is near them. A remarkable instance of this kind took place at Coldstream in the year 1786, when a man and two horses were killed by the returning stroke, soon after passing the Tweed.

Coulomb appeared as an electrician about the year 1785, and added more important facts than any who had appeared after the time of Franklin. He began by constructing a very delicate electrical balance, which measured the attractive and repulsive forces by the torsion of a very fine wire. The three discoveries which he made by means of this balance constitute, in fact, the basis of all electrical theory. These discoveries are the following:—

1. The attractions and repulsions of electrical bodies vary inversely as the square of their distances.

2. When insulated bodies are charged with electricity, they gradually lose that charge. This is partly owing to the surrounding atmosphere, which never being absolutely free from conducting particles, these particles gradually get possession of the electricity, and carry it off. It is partly owing also to the electric bodies, which serve as insulators. There is probably no substance absolutely impervious to electricity; though some are more and some less so. Hence the electricity gradually passes off along the insulated body. Coulomb determined the effect of both these causes, and thus put it in the power of electricians to calculate how much electricity an insulated body loses in a given time.

3. When electricity is accumulated in any body, the whole of it is deposited on the surface, and none of it penetrates into the interior. So that a hollow sphere, how thin soever its walls may be, is capable of receiving as great an electric charge as a solid body of the same dimensions.

From the various experiments of Davy in 1822, there is reason to conclude that the electric spark is merely evolved by the sudden condensation of air, or any elastic fluid through which the electricity passes. For though electricity passes readily through an absolute vacuum, no spark whatever can be perceived.

Electricity may be evolved in some bodies by heat as well as friction. This is the case with the tourmalin, the electrical properties of which were investigated by Bergmann and Æpinus. When a transparent tourmalin is heated to 212° one of its ends becomes positive and the other negative, while the centre of the prism is a neutral point, exhibiting no signs of electricity whatever. From 212° the electric energy increases rapidly, till the temperature sinks to 156°, when it is a maximum. From 156° to 104° it remains nearly stationary, and sinks rapidly from 104° to 70°, when it is nearly the same as at 212°. If we break the tourmalin in two while in a state of excitement, each of the fragments will be found to possess precisely the electrical properties of the whole crystal.

The tourmalin is not the only mineral which exhibits these properties. Four or five other crystallized minerals possess similar properties.

Becquerel has lately shown, that when two elastic bodies are pressed strongly against each other, provided both be insulated, they acquire different states of electricity, the one becoming positive and the other negative. Iceland-spar, sulphate of lime, fluor-spar, sulphate of barytes,

when pressed against cork, become positively electrified, while the cork becomes negative. But cork becomes positive when pressed against cyanite and retinasphaltum. Electricity thus evolved continues a long time.

Pouillet has lately ascertained that when charcoal is burned, the portion of the piece which is unconsumed becomes charged with negative electricity, while the carbonic acid gas formed is positive. When hydrogen is burned, the air round the flame at some distance is positive, but the centre of the flame is negative.

About the beginning of the present century a new and most important electric instrument was contrived by Volta, which has been employed with the most fortunate success in promoting the science of chemistry. When two different metals, zinc, for example, and copper, are placed in contact, and then separated, the zinc is electrified positively and the copper negatively. If we take a number of pairs of these two metals, placing each pair in contact and in the same order, and introduce between each pair a card moistened with wet salt water, a current of electricity is evolved. If we apply the wet finger of one hand to the top of such a pile, and the wet finger of the other hand to the bottom of the pile, we immediately feel an electric shock, the intensity of which increases as the number of pairs of plates. With 100 pairs the shock is severe. Such was the origin of what is called the galvanic or voltaic battery. The plates are usually about 3 or 4 inches square. Each zinc plate is surrounded with copper, distant from it about a quarter of an inch, except at the top, where the two plates are soldered together. These plates are inserted into the cells of a porcelain trough, so fixed that the copper plate of one cell is soldered to the zinc plate of the next cell. The cells are filled with a weak solution of nitric acid. About 200 pairs of plates thus united constitute a pretty powerful galvanic battery.

In such a battery, the plate at one end is copper, and that at the other end zinc. The zinc end is positive, the copper end negative. When the two extremities are joined by a conducting wire, a current of electricity passes uninterruptedly through the battery as long as the nitric acid is dissolving the zinc, which it attacks in preference to the copper. But when the acid is saturated with oxide of zinc, the current is at an end. The quantity of electricity thus set in motion is very great, but its intensity is low. When the conducting wires are iron or platinum, they become red-hot, and even undergo fusion if they are not too long or too thick. Pieces of charcoal, attached to platinum wires from each extremity of the battery, when placed in contact, become white hot, and burn, if surrounded with air or oxygen gas, with very great splendour.

If a platinum wire from the positive extremity of the battery be plunged into a glass of water, and a platinum wire from the negative extremity be plunged into the same glass, taking care that the two wires do not touch each other, the water immediately begins to undergo decomposition; oxygen gas being evolved from the positive wire, and hydrogen gas from the negative, exactly in the proportions that exist in that liquid. If the positive wire be iron or copper, oxygen gas is not evolved from it in the requisite quantity, but the wires become oxidized. If a salt be dissolved in the water it undergoes decomposition, its acid being attracted towards the positive pole, and its base to the negative pole. All chemical compounds are decomposed by this battery, if sufficiently powerful, and they are decomposed according to this law. Oxygen, chlorine, bromine, iodine, and fluorine, together with all acids, are attracted to the positive pole, while hydrogen, azote, alkalies, earths, and metals, are attracted to the negative pole.

The same progress has not been made in developing the theory of this curious piece of electrical apparatus as has taken place in investigating the phenomena which it produces. The action of the battery is limited to the time of the chemical action of the nitric acid on the zinc; hence it is obviously connected with this action. No liquid conductor is found to answer, unless it be capable of acting chemically on the zinc. Nitric acid answers better than any other acid, and it dissolves the zinc more rapidly than any other. See ELECTRIC TELEGRAPH.

MAGNETISM.

The ore of iron called the *loadstone* was known to the ancients, and the property which it possesses of attracting iron-filings; but they were ignorant of the *directing* power, which has been turned to such important account in modern navigation. But this directing power, there is reason to believe, was known to the Chinese at least 2000 years ago, though they did not turn it to so good account as the inhabitants of Europe. Whether the knowledge of the mariner's compass was brought from the East is not known. But a citizen of Amalphi, in Italy, whose name is said to have been Flavio Gioyo,

first constructed the mariner's compass such as we have it at present, and marked the north end of the needle with a *fleur-de-lis*, the armorial bearing of the Kingdom of Naples.

The first person who attempted to generalize the magnetic phenomena was Dr. Gilbert of Colchester, who began his career during the reign of Queen Elizabeth. He found that every magnet, whether natural or artificial, has its powers concentrated in two opposite points, called the north and south poles; intermediate between which there is a neutral point: that similar poles repel, while opposite poles attract, with a force (as was afterwards ascertained by Coulomb) varying inversely as the square of the distance. If a long bar of iron be held in a position nearly vertical, its lower extremity is always found to manifest the properties of a north pole. From this fact Gilbert inferred the magnetism of our globe.

The variation or declination of the needle was discovered by Columbus during his celebrated voyage of discovery; since which time it has been regularly observed. In 1580 the needle in London pointed 11° 15′ E. of N. In the year 1657 it pointed due north. Its declination increased yearly in a westerly direction till 1814, when it reached its greatest distance west, namely 24° 21′ 10″. Ever since 1814 it has been going east at a very slow rate.

The dip or inclination of the magnetic needle was first observed by Norman, in the year 1576. If a steel needle suspended freely from its centre of gravity be converted into a magnet, it will no longer hang perpendicularly; one end of it will incline downwards, while the other will rise above the horizontal position. This is called the dip. Norman found the dip of the north pole at London to be 71° 50′. From that time it continued constantly to increase at a very slow rate till the year 1720, when it seems to have reached its maximum, namely, 75° 10′. Ever since it has been slowly diminishing. In 1821 it was 70° 3′.

From numerous observations made in different parts of the torrid zone, there is reason to believe that the line of the dip or the magnetic equator is distant at a maximum about 12° from the terrestrial equator. It is a great circle of the sphere, and cuts the equator on two places, in about 113° W. longitude and 67° E. longitude. As we advance north or south from this magnetic equator the dip slowly increases, the south pole dipping if we go south, and the north pole if we go north.

The first person who attempted to account for the declination of the needle was Dr. Halley. He considered the globe of the earth as constituting one great magnet, having four poles, two to the north, and two to the south, at considerable but unequal distances from the poles of the earth. Two of these poles he considered as fixed, and two as movable. This subject was taken up by Professor Henstein of Christiania, who has had the advantage of another century of observations. He has adopted the Halleyan hypothesis, with some modifications. One of the north and one of the south poles is weaker than the other. One of the north poles revolves round the pole of the earth in 1740, the other in 860 years. The stronger north pole is at present situated in north latitude 73° 53′, and west longitude 87°; the weaker in north latitude 85° 12′, and east longitude 140° 6′. The stronger south pole is in south latitude 68° 52′, and east longitude 132° 35′; the weaker in south latitude 78° 16′, and west longitude 135° 59′.

In 1722 Mr. Graham discovered the daily variation of the needle. The subject was prosecuted by Mr. Carters; and Colonel Beaufoy determined the amount of the daily variation for a number of years with indefatigable accuracy. It was taken up at last by Mr. Barlow and Mr. Christie. They all concur in showing that the daily variation is owing to the action of the sun on the needle altering the intensity somewhat by the effect of his heat.

Mr. Barlow ascertained that the intensity of the action of iron on a magnetic needle is proportional to its surface, not to its solid contents; so that a hollow sphere of iron, however thin, has as great an effect upon a needle as a solid iron sphere of the same diameter.

It was supposed at first that iron or substances containing iron were alone susceptible of the magnetic influence; but cobalt and nickel were afterwards found capable of being converted into magnets, though less powerful than those of steel. Coulomb showed that all bodies were to a certain extent susceptible of magnetic influence.

While hot, iron has no effect upon the magnetic needle; but as the iron cools it begins to act, and it acts most powerfully at a blood-red heat. Mr. Barlow and Mr. Charles Bonnycastle observed that between a bright-red and a blood-red heat it acts in the opposite way from what it does when cold. If it attract the north pole of the needle while cold, it will attract the south pole at the temperature above specified.

Mr. Barlow found that if a magnetic needle be placed at a certain distance from a mass of iron, the needle is deflected when the iron is put into rapid motion.

About the year 1824 M. Arago discovered that when plates of copper and other substances are set in rapid revolution beneath a magnetized needle, they cause it to deviate from its

direction, and finally to drag it along with them. This curious fact was repeated and verified in 1825 by Messrs. Herschell and Babbage. They mounted a powerful compound horse-shoe magnet, capable of lifting 20 lbs., in such a manner as to receive a rapid rotation about its axis of symmetry placed vertically, the line joining the poles being horizontal, and the poles upwards. A circular disk of copper, 6 inches in diameter, and 0·85 inch thick, was suspended centrally over it by a silk thread without torsion, just capable of supporting it. A sheet of paper properly stretched was interposed, and no sooner was the magnet set in rotation than the copper commenced revolving in the same direction, at first slowly, but with a velocity gradually and steadily accelerating. The motion of the magnet being reversed, the velocity of the copper was gradually destroyed; it rested for an instant, and then began to revolve in the opposite direction.

The rate of rotation was not diminished by interposing between the copper and the revolving magnet plates of paper, glass, wood, copper, tin, zinc, lead, bismuth, or antimony. But it was greatly diminished when the substance interposed was iron. One sheet of tin-plate reduced the rate of rotation to about one fifth part, and two sheets nearly destroyed it.

When disks of other metals were substituted for copper, they were found also capable of being made to rotate, though with different degrees of rapidity. The order of the different metals, and the intensity of the force of each, that of copper being reckoned 1, was as follows:—

Copper	1·00
Zinc	0·90
Tin	0·47
Lead	0·25
Antimony	0·11
Bismuth	0·01
Wood	0·00

When these disks were cut with a pair of scissors in various radii, stretching from the circumference nearly to the centre, the force was greatly weakened; but it was nearly restored again by soldering these intervals with any metal whatever.

Silver was found to hold a high rank among the metals, and gold a very low one. Mercury lies between antimony and bismuth. The only other substance besides the metals in which any traces of magnetism have been perceived, is charcoal, in that state in which it is deposited at a red heat from coal-gas, lining the retorts, and gradually filling them.

Copper revolving produces no effect upon copper. It was always necessary, in order that motion should be produced, that one of the bodies should be a magnet. It is obvious that magnetism is introduced into the copper and the other metals by induction.

The intensity of the directive force of a magnetic needle may be measured by causing the needle to vibrate in small arches, and counting the number of vibrations performed in a given time; the intensity of the directing force being inversely as the square of the number of vibrations.

The effect of an electric current upon a magnetic needle was accidentally discovered by Professor Œrsted of Copenhagen, in the year 1819. While a galvanic battery was in action he placed a needle under the wire which united the two poles of the battery, and observed that it placed itself at right angles to the conducting wire. When placed above the conducting wire, it also placed itself at right angles to it; but in that situation the needle was reversed, the north pole pointing the contrary way from what it did when the needle was under the wire. If the needle be *above* the conducting wire, the north pole turns to the *left* of the current of positive electricity. If it be below the conducting wire, the same pole turns to the right. When the needle is placed on the west side of the conducting wire (supposed to be nearly in the magnetic meridian) and parallel to it, the north pole will be elevated; but when placed on the east side of the conducting wire, the same pole is depressed.

Arago and Davy observed, about the same time, that the conducting wire, while the galvanic battery is in activity, attracts iron-filings; but the moment the contact is interrupted, the filings drop off; but bodies not magnetic are not attracted by it.

Arago observed that if a copper wire be wound spirally round a glass tube, and then made to unite the opposite poles of a galvanic battery, if a steel needle be introduced into the inside of the tube it is instantly converted into a magnet. If the copper wire be twisted round a mass of soft iron, shaped like a horse-shoe magnet, and made to unite the opposite poles of a galvanic battery in action, the soft iron becomes a powerful magnet, and retains its virtue while the battery continues in activity; but if we interrupt the connection of the copper wire with either of the poles of the battery, the magnetic virtue disappears.

Next to the discoveries of Œrsted, those of Mr. Faraday are the most important. He first observed that the position of the magnetic needle, with respect to the conducting wire, greatly modified the effects produced. He ascertained that the apparent attraction of the needle on one side, and its consequent repulsion

on the other, did not occur in all circumstances; but that according as the wire was placed nearer to or farther from the pivot of the needle, attractions or repulsions were produced on the same side of the wire. When the wire is made to approach perpendicularly towards one pole of the needle, the pole will pass off on one side, in that direction which the attraction and repulsion at the extreme point of the pole would give. But if the wire be made continually to approach the centre of motion, by either the one or the other side of the needle, the tendency to move in the other direction diminishes; it then becomes null, and the needle is quite indifferent to the wire; and ultimately the motion is reversed, and the needle endeavours to pass the opposite way.

From these facts Mr. Faraday concluded that the centre of magnetic action, or the true pole of the needle, is not placed at its extremity, but in its axis, at a little distance from the extremity, and towards the middle; that this point has a tendency to revolve round the wire, or, which is the same thing, the wire round the point. He found upon trial that the conducting wire of a battery, if at liberty to move, will revolve round the poles of a magnet while the battery is in action. This discovery has given occasion to a variety of little toys, in which small batteries are made to revolve round the poles of a magnet or magnets round a wire, uniting the opposite poles of a battery in action.

Mr. Faraday has more lately discovered that when the two poles of a magnet are joined by a piece of soft iron, when one of the poles is disengaged from the iron a spark is perceived; but this spark does not appear when both poles are disengaged together.

From the phenomena of magnetism just enumerated, there cannot be a doubt that electricity and magnetism depend upon the influence of the same principle. What that principle is may never be discovered. It has been usual to consider it as a subtile and elastic fluid which revolves round the surface of an excited body in a spiral direction. Doubtless the magnetic poles of the earth result from electric currents. But we are still in the dark with respect to the reason why only steel, nickel, and cobalt can be converted into magnetic needles, and why the magnetic virtue is so weak in the other metals.

CHEMISTRY.

Chemistry, unlike the other sciences, sprang originally from delusion and superstition, and was, at its commencement, on a level with magic and astrology. After shaking off this unhallowed connection, it offered its services to the physician in the humble rank of an assistant in the preparation of medicines. Its services being accepted, it ventured occasionally to investigate the nature of the medicines employed by medical men, to simplify and improve them, and even to suggest the employment of new remedies, when they appeared from the researches made to be superior to the old. From this humble beginning it gradually extended its benefits to miners, metallurgists, and artists in general; and examining the properties of all the substances in nature, ameliorated, and improved, and simplified many of the most useful processes.

We have no evidence that the ancients were acquainted with chemistry, in the modern sense of the word; but it was cultivated by the Arabians after the establishment of the empire of the caliphs. Geber, who lived in the eighth century, is almost the only chemical writer among the Arabians whose works have become known in Europe. Four tracts of his, known by the quaint titles, Of the Investigation or Search of Perfection; Of the Sum of Perfection, or the Perfect Magistery; Of the Invention of Verity or Perfection; Of Furnaces, &c., have been translated into Latin, and likewise into English.

His object was the preparation of a universal medicine; and during his investigation of it, he states a number of circumstances, which enable us to appreciate the degree of chemical knowledge which he possessed, and which may be summed up under the following heads:—

1. He was acquainted with gold, silver, copper, iron, tin, lead, mercury, arsenic. Whether he was acquainted with antimony is not so clear.

2. Potash and soda were known to him, at least in the state of carbonates. But whether he was aware of their different properties does not appear.

3. He was acquainted with sulphuric acid, nitric acid, and probably muriatic acid; or at least he prepared an aqua regia, by mixing sal-ammoniac with nitric acid, which enabled him to form a liquid capable of dissolving gold.

4. He knew common salt, saltpetre, sal-ammoniac, alum, sulphate of iron, borax, corrosive sublimate.

5. He was acquainted with red oxide of mercury, oxide of copper, red-lead, and litharge.

6. He employed vessels for distillation, and used aludels of stoneware, glass, and metal. The water bath, the common still, the method of distilling per descensum, furnaces for melting

and calcining metals were familiar to him. Vinegar was used as a solvent by him in many of his processes.

As chemistry is entirely an experimental science, and as the number of facts and compounds gradually discovered is exceedingly great, it would be impossible in a sketch of this kind to notice every individual improvement or discovery. We shall therefore satisfy ourselves with pointing out those which had the greatest influence upon the progress of the science.

When we have a compound of two bodies united together, and wish to separate one of them, the successful process is to add a third body. This third body, in many cases, unites with one of the ingredients of the compound, and disengages the other. Thus saltpetre is a compound of nitric acid and potash, in the proportion of 6·75 of the former and 6 of the latter. If we want to procure the nitric acid, we shall succeed if we put 12·75 of nitre into a retort, and pour over it 12·25 of the sulphuric acid of commerce. Upon applying heat to this mixture, the nitric acid of the saltpetre will come over into the receiver, together with the water of the sulphuric acid, making together 9; and there will remain in the retort all the potash, combined with all the sulphuric acid, weighing together 16. Magor, in the fourteenth section of his treatise De Spiritu nitro-aereo, published in 1678, seems to have been the first person who explained in an intelligible manner these mutual unions and decompositions which take place in salts when a third body is judiciously added. The theory was afterwards suggested by Sir Isaac Newton at the end of his Optics. The union he ascribed to an attraction existing between the atoms of bodies, and the decomposition to the addition of a body having a greater attraction for one of the constituents of the compound than the constituent has which it displaces. Tables exhibiting the order in which these decompositions take place were first drawn up by Geoffroy Junior in 1718. These tables were gradually improved, till at last they were brought to the greatest degree of perfection which they have yet attained, by Bergmann, in the year 1783.

Sir Humphrey Davy made a most important improvement in this theory of attraction and decomposition, and first rendered the way in which decomposition takes place intelligible. The atoms of bodies, according to him, are always in an electrical state; some of them being positive and others negative. Bodies in the same state have no affinity for each other, and of course do not unite unless one of them be much more powerfully positive or negative than the other. When this happens, and the two atoms are brought near each other, the opposite state may be produced in the other by induction, in which case union may take place. Thus oxygen and chlorine are both negative, but oxygen much more so than chlorine. Hence when they approach near each other, the negative state of the former will increase, while that of the latter will diminish, so that it may become actually positive, though only weakly so. Hence they will unite, but the union will not be strong.

Bodies in different states have an affinity for each other, and this affinity augments in proportion to the intensity of the two states of electricity in the two bodies. Thus oxygen is intensely negative, and hydrogen is intensely positive. Hence there is a strong affinity between them. Sulphuric acid is negative, and magnesia positive; hence they unite and constitute sulphate of magnesia. Potash is more strongly positive than magnesia. Hence, when it is mixed with sulphate of magnesia, it will not only attract the sulphuric acid more strongly than the magnesia does, but it will, at the same time, repel the magnesia, because both are in the same electrical state. This greater attraction, combined with the repulsion, is capable of driving off the magnesia, and enabling the potash to take its place.

The first attempt to generalize the phenomena of chemistry was made by Beccher, and by his successor Stahl. Combustion was the most extraordinary phenomenon in chemistry. It was confined to a certain set of bodies called *combustibles*. When these bodies were heated in the open air they became hotter of themselves, and continued for a certain time to give out heat and light in great abundance. When the process is at an end these bodies have lost their original appearance, and have assumed another quite different. Thus, when sulphur is burned, it is converted into an invisible gaseous body, having a strong and suffocating smell and a sour taste, and known by the name of sulphurous acid. Phosphorus is changed into a white, solid, sour-tasted body, called phosphoric acid; iron into a *red* powder, lead into a red or yellow powder, and mercury into a black or red powder. Beccher and Stahl thought that all combustible bodies owe their combustibility to the presence of a peculiar body, which was the same in all, and to which they gave the name of *phlogiston* (or *the combustible body*). During the burning of the combustible body the phlogiston makes its escape, and what remains is the other constituent: for all combustibles, in their opinion, consisted of two constituents, phlogiston and an incombustible

substance which varied for each body. For sulphur, it was sulphurous acid; for phosphorus, phosphoric acid. For iron, lead, and mercury, the black, yellow, or red powders which remain when these metals are calcined. These opinions were universally adopted by chemists, and modified their views, and regulated their mode of experimenting. Boyle, indeed, had shown that tin, when calcined, increases in weight; but this did not alter their opinions, because the increase of weight was ascribed to *fire* fixed in the tin during the process of calcination.

Chemistry continued in this country little else than the art of preparing medicines till Dr. Cullen began his great career about the year 1740. He was aware of the important purposes to which the science might be applied, and had devoted himself to the subject. In 1746 he was appointed lecturer on chemistry in the College of Glasgow; and though his attention was speedily withdrawn from his favourite science by his being placed in the medical chair of that university, yet he had the merit of rendering chemistry popular, and of educating Dr. Black, who became his favourite pupil and friend.

Black, when a very young man, discovered that limestone is a salt composed of two different constituents, namely, lime, which possesses the characters of an alkali or base; and carbonic acid, which possesses the characters of an acid. This last ingredient is a gas or aerial body when in a separate state. Hence it is disengaged when lime is dissolved in an acid, and occasions the *effervescence* which always accompanies such solutions. When the limestone is exposed to a strong heat the carbonic acid is, in like manner, driven off, and leaves the lime in a separate state. What is called quicklime, or burned lime, is the pure substance, or caustic lime. When combined with carbonic acid it loses its causticity, and is converted into a mild tasteless salt.

Mr. Cavendish took up the subject of carbonic acid where Dr. Black had laid it down. He determined its specific gravity, its solubility in water, and its various other properties. Bergmann dwelt upon its acid characters, and described the salts which it forms with the various bases. Dr. Priestley made experiments upon its antiseptic properties, and, together with Dr. M'Bryde, recommended water impregnated with it as a valuable medicine. Lavoisier determined its nature, showed that it was formed during the combustion of charcoal, and that it was a compound of three parts by weight of charcoal and eight parts of oxygen. Hence the reason of its formation during the combustion of wood and coal, and all those bodies which contain charcoal.

Mr. Cavendish examined the properties of hydrogen gas, showed how to prepare it by dissolving iron or zinc in dilute sulphuric acid, determined its sensible qualities, ascertained its specific gravity, examined its combustibility, and discovered that when burned it unites with half its volume of oxygen gas, and that the product is water. The subsequent investigations of Dr. Prout and Dr. Thomson have shown that oxygen gas is sixteen times heavier than the same bulk of hydrogen gas. Hence, as water is a compound of one volume of oxygen and two volumes of hydrogen, it follows that water contains $\frac{8}{9}$ths of its weight of oxygen, and $\frac{1}{9}$th of hydrogen.

Dr. Priestley discovered oxygen gas on the 4th of August, 1774, by heating the red oxide of mercury in a gun-barrel. He found it to be a gas; that bodies burn in it better, and that animals are capable of breathing it longer than common air. He considered common air as a compound of oxygen and phlogiston. When air is saturated with phlogiston, he thought it was converted into azotic gas, which therefore he called *phlogisticated air*. For a similar reason he called oxygen *dephlogisticated air*. But Scheele, who had been engaged in the same investigations, without being aware of the labours of Priestley, took a simpler view of the subject. He considered common air as a mixture of oxygen and azotic gases; both of which he thought were simple bodies. It was the oxygen that made air capable of supporting combustion, and capable of being breathed. Lavoisier adopted the opinion of Scheele, and betrayed the origin of his views by assuming the very same proportions of oxygen and azotic gas in air that Scheele had done. Cavendish, in 1783, demonstrated that air is a compound of about four volumes azotic and one volume oxygen gas; and he showed, by making trials in the neighbourhood of London for a whole year, that these proportions do not sensibly vary. These views, after having been neglected or overlooked by chemists for nearly twenty years, were universally adopted about the beginning of the present century, chiefly in consequence of the observations of Berthollet.

Chlorine was discovered by Scheele in 1774, during his researches on manganese. He found that it was disengaged when muriatic acid was digested on the black oxide of manganese. He observed its smell, its colour, and its property of destroying vegetable colours; and he considered it as muriatic acid deprived of phlogiston, by which term he understood hydrogen gas. The properties of this gas were further examined by Berthollet and Chenevix. Berthollet considered it as a compound of muriatic acid and oxygen;

and, therefore, gave it the name of oxy-muriatic acid. He had the merit of first proposing it to bleach linen and cotton, a process which was afterwards brought to perfection in Glasgow. In 1809 Gay-Lussac and Thenard made a set of experiments in order to separate oxygen from it, but without being able to obtain any evidence that it contained any. The subject was taken up by Davy in 1810. He was equally unable to obtain any proof of the presence of oxygen in it. He, therefore, affirmed that it was not a compound of muriatic acid and oxygen; but a simple substance, similar in many of its properties to oxygen itself, and, like it, capable of uniting with all the other simple bodies. This induced him to give it the name of *chlorine*, from a Greek word signifying *grass green*. He showed that when equal volumes of chlorine and hydrogen gases are mixed together, and an electrical spark passed through the mixture, combustion takes place; the two gases unite, and are converted into muriatic acid gas, equal in volume to the bulk of the two gases before combustion. Hence it follows that muriatic acid is a compound of chlorine and hydrogen. Thus the theory of Scheele was established by Davy.

Bromine was discovered by M. Balard in 1825, and iodine by M. Courtois in 1811. The former is a hyacinth-red liquid, the latter a bluish volatile solid, having the metallic lustre and some resemblance to antimony in its appearance. The properties of bromine were investigated by Balard, and those of iodine by Gay-Lussac and Davy; but chiefly by the former. Both of these bodies are simple substances; both resemble chlorine very closely in their characters, and, like it, they combine with other bodies. The compounds of chlorine, bromine, and iodine with other substances, are distinguished by the names of *chlorides*, *bromides*, and *iodides;* just as the compounds of oxygen are called *oxides*.

Azotic gas was first noticed by Dr. Rutherford, in his thesis written in 1772. Scheele published his analysis of air, and his investigation of the properties of *azote*, in the year 1777; and Priestley investigated various of its properties. But it is to Mr. Cavendish that the science is chiefly indebted for everything accurate that has been determined respecting this gas. He ascertained the volume of it that exists in common air, showed that it is capable of combining with oxygen, and that the compound formed is *nitric acid*. It was afterwards ascertained that the specific gravity of azotic gas is 0·9722, and that of oxygen gas 1·1111, and that nitric acid is formed by the union of one volume of the former gas with two and a half volumes of the latter; so that nitric acid is a compound of 1·75 of azote and 5 of oxygen by weight.

Dr. Priestley investigated the properties of nitrous gas and protoxide of azote, and pointed out the importance of the former in analyzing air. Davy subjected them to analysis, and obtained pretty near approximations. The subject was afterwards resumed by Dalton, and reduced to its present state of simplicity by Gay-Lussac. These gases are compounds of azote and oxygen; the former of 1·75 azote and 2 oxygen, and the latter of 1·75 azote and 1 oxygen.

Before the rise of scientific chemistry in Britain the two alkalies, potash and soda, were known, but they were not accurately distinguished from each other till Duhamel published his dissertation on the subject in 1737. Lime had been known from the beginning of the world; but its characters were first accurately pointed out by Hoffmann. Magnesia had been discovered about the beginning of the eighteenth century, but chemists were not acquainted with its true character, and were in the habit of confounding it with lime, till its properties, and the salts which it forms, were accurately pointed out by Black in 1765. Scheele discovered barytes in 1774, and strontian was recognized as a peculiar substance as early as 1789, but its true nature remained uncertain till Dr. Hope published his experiments on it in 1791, and Klaproth his a few months earlier. Lithia was discovered by Arfvedson in the year 1718. These seven bodies were distinguished by the names of alkalies and alkaline earths. Their properties were gradually determined with accuracy, and the striking analogy which they have to each other was recognized; but all the attempts made to determine their constituents were long unsuccessful. At last Davy, in 1808, demonstrated that potash is a compound of oxygen and a white very combustible metal, to which he gave the name of potassium; and soda, of sodium and oxygen. He was able soon after to show that lime, barytes, strontian, and magnesia are also compounds of metals and oxygen. And when lithia came to be known, he showed that it also was a compound of the metal lithium and oxygen. Thus it was discovered that all the alkalies and alkaline earths are metallic oxides.

Alumina was known to the alchemists, but its peculiar nature and properties were first determined by Margraaff in 1754, and afterwards more accurately by Scheele and Bergmann. *Glucina* was discovered in 1798 by Vauquelin, as a constituent of the beryl and emerald; and yttria, in 1796, by Gadolin of Abo. *Cerium* was made known in 1804 by Klaproth under the name of *ochroita*, and a little after it was more

accurately examined by Berzelius and Hisinger, who gave it the name of *cerium*. *Zirconia* was discovered in the zircon in 1789, by Klaproth, and afterwards in the hyacinth; and *thorina* was discovered by Berzelius in 1828.

The analogy between these five bodies and the alkaline earths was so strong, that as soon as the nature of the latter was ascertained, chemists in general inferred that the former also were metallic oxides; but several years elapsed before this opinion was verified by experiment. At last, a few years ago, Œrstedt discovered that if alumina be intimately mixed with dry charcoal, heated in a tube, and a current of dry chlorine gas be made to pass over it, decomposition takes place, and a pale greenish yellow substance sublimes, which is a chloride of aluminum. Wohler found that when this chloride is heated with potassium it undergoes decomposition, the chlorine uniting with the potassium, and the aluminum being set at liberty. The aluminum, or base of alumina, thus obtained is a white metal in grains, requiring a very high heat to fuse it; probably malleable and permanent in the air, or under water. When heated in air or oxygen gas it takes fire, burns, and is converted into alumina by uniting with oxygen.

Glucina was decomposed, and its basis glucinum obtained, by the very same process. The same remark applies to yttria. Glucinum and yttrium have a strong resemblance to aluminum. Cerium was first obtained in the metallic state by Laugier in 1814, and zirconium by Berzelius in 1824. This last substance wants the metallic lustre, and has a much stronger resemblance to charcoal than to a metal. Thorina was reduced precisely in the same way as alumina. Thorium has also a striking resemblance to aluminum in its properties.

Thus it has been ascertained that all the fixed alkalies, the alkaline earths, and the earth proper, amounting altogether to thirteen, are metallic oxides.

The remaining simple bodies have been divided into two sets; namely, acidifiable bases and alkalifiable bases. The acidifiable bases are eighteen in number. Of these there are two, charcoal and sulphur, which were known to the ancients. All the rest have been discovered by the researches of chemists or chemical physicians. The history of the discovery of hydrogen and azote has been already given.

Borax seems to have been known to Geber in the eighth century. It is found in Thibet and China, and is much used in India as a vehicle for the solution of varnishes, &c. Boracic acid was extracted from it in 1702 by Homberg, and in 1752 Baron showed that borax is a compound of boracic acid and soda. In 1808 Gay-Lussac and Thenard, by heating boracic acid and potassium, decomposed it, and obtained its basis, to which the name of *boron* has been given. It is a black powder like charcoal, possessing peculiar properties; burning when heated in contact with air or oxygen gas, and being converted into boracic acid.

Silica is one of the most abundant substances in nature, and, under the name of *rock-crystal*, was known to the Greeks. But its chemical properties were first accurately investigated by Bergmann and Scheele. Berzelius, in 1824, succeeded in showing it to be a compound of oxygen and a black substance called *silicon*, very similar in many of its properties to charcoal, though quite different in others. For example, it does not burn when heated in air or oxygen gas; but it burns when heated with carbonate of potash.

Phosphorus was accidentally discovered by Brandt in 1669; selenium by Berzelius in 1818; tellurium was pointed out, with some hesitation, by Müller of Reichenstein in 1782; and its characters finally determined by Klaproth in 1798.

The white oxide of arsenic was known to the Arabians; but we do not know who first attended to its metallic basis—though, as this basis is found in the earth in the metallic state, it could not have escaped altogether the attention of miners and metallurgists. Paracelsus seems to allude to it; and Schroeder, in his Pharmacopœia, published in 1649, gives us a process for obtaining it. Its characters were first determined by Brandt in the year 1733.

The ancients were acquainted with the oxide and sulphuret of antimony, but not with the metal. When the metal became known we do not know, but Basil Valentine was acquainted with it in the fifteenth century.

Chromium was discovered by Vauquelin in 1797; uranium by Klaproth in 1789; vanadium by Sefstrom in 1830; molybdenum by Scheele and Hjelm in 1778 and 1782; tungsten by Scheele and D'Elhuyarts in 1781; columbium by Hatchett in 1801; and titanium by Gregor in 1791.

The alkalifiable bases are thirty-one in number. We have already given the history of the discovery of the first thirteen of these, constituting the bases of the fixed alkalies, alkaline earths, and earths proper. The ancients were acquainted with iron, lead, tin, copper, mercury, silver, and gold. Manganese was discovered by Scheele in 1774, and reduced to the metallic state by Gahn soon after; nickel was examined by Cronstedt in 1751; cobalt by Brandt in 1733. Zinc appears to have been known in China and the East for many ages; but it was never smelted in Europe till Henkel pointed out a

process in 1721. Cadmium was discovered by Stromeyer in 1817. Bismuth occurs native in some of the German mines; and was, of consequence, known as soon as these mines were worked. Agricola mentions it in his Bermannus, published in 1529; but Beccher, Pott, and Geoffroy Junior were the first chemists who investigated its properties.

Platinum was known to the Spaniards soon after the colonization of South America; but its chemical properties were first investigated by Scheffer, in 1752, and still more completely by Lewis in 1754. Palladium and rhodium were discovered by Dr. Wollaston in 1803 and 1804; and iridium and osmium by Mr. Smithson Tennant about the same time.

The acids at present known to chemists amount to 126. It would be too tedious a task to enumerate them all, and to point out the persons by whom they were discovered. We may, however, state that Scheele did more to improve this important branch of chemistry than any other individual. He made known and described no fewer than eleven new acids; namely, fluoric, molybdic, tungstic, arsenic, lactic, gallic, tartaric, oxalic, citric, malic, and saclactic. It was he also that first isolated the prussic acid, and commenced that interesting branch of chemistry which was brought to perfection by Gay-Lussac when he discovered and determined the nature of cyanogen, and the compounds which it forms.

To Mr. Dalton we are indebted for a branch of chemistry which promises fair to reduce the science to the same accurate state which distinguishes astronomy, by the application of rigid calculation. It had been observed before that bodies unite in definite proportions. He showed that these proportions might be stated in numbers; and concluded that bodies unite atom to atom, and that these numbers denote the relative proportions of the weights of these atoms. Berzelius first endeavoured to obtain accurate atomic numbers by means of analysis. The result has been a great improvement in the accuracy of analysis, and much more correct notions respecting the nature and properties of chemical substances than were formerly entertained. This branch of the science is advancing apace. The number of salts which have been formed, and examined with more or less accuracy, amount to about 2200, and their number is increasing daily.

The application of chemistry to the vegetable and animal kingdoms, the interesting facts laid open respecting vegetable substances and vegetation, and the light thrown upon some of the most important functions of living animals, constitute, if possible, a still more interesting branch of the science than those upon which we have already touched; and that its future progress will develop many new facts still more important than those already known cannot be doubted. But in a dissertation like the present, which is so much limited in point of extent, it would be impossible to give historical details of even the most important branches of a science much more extensive than any other to which mankind have devoted their attention, and which is daily extending itself still farther, by entering upon important fields of investigation not yet traversed.

Here, then, we shall conclude this historical sketch. We have found it necessary, from the limited space allowed us, to omit much. Yet the view which we have given, imperfect as it is, shows sufficiently the splendid improvements made in science by the moderns, and the immense blanks still left for posterity to fill up. Astronomy alone has advanced to a state approaching to perfection; but chemistry, already one of the most important of the sciences, and destined ultimately to become much more so, is still almost in a state of infancy.

August, 1838.

muffled oars, under cover of the night, and appeared unexpectedly before the city. He effected his object by intercepting a large stock of provisions, and capturing several vessels laden with military munitions and valuable stores for the British officers. He was afterwards named commander of a seventy-four building in New Hampshire; but, this vessel having been presented by Congress to the King of France, he was transferred to the *Alliance*, a frigate of 36 guns, which was placed under his orders. December 25, 1781, the *Alliance* sailed from Boston, with the Marquis de la Fayette and Count de Noailles on board, who were proceeding to France on public business. During the rest of the war, Barry served with credit to himself and benefit to his country, and, after the cessation of hostilities, was appointed to superintend the building of the frigate *United States* in Philadelphia, which was designed for his command. He retained the command of the *United States* until she was laid up in ordinary. After a life of usefulness and honour, Barry fell a victim to an asthmatic affection, at Philadelphia, September 13, 1803.

BARSABAS, was son of Alpheus, brother of James the Less and of Jude, and was one of the candidates nominated for the apostolical office left vacant by the treachery and suicide of Judas. According to tradition, he was afterwards appointed Bishop of Eleutheropolis, a town of Palestine, about 20 miles from Jerusalem, and suffered martyrdom. Another Barsabas, surnamed Judas, and supposed to be the brother of the above, is mentioned in the Acts as one of the companions of Paul and Barnabas when they went to preach the gospel at Antioch. He is supposed to have returned to Jerusalem, and died at a very advanced age.

BAR-SUR-AUBE (*Barrum ad Albam*), an ancient town, France, in the department of Aube, 29 miles E. from Troyes, agreeably situated on the right bank of the Aube, here crossed by a bridge; at the foot of the St. Germain Mountain, in a valley, surrounded with picturesque hills covered with vineyards. In general, it is badly built, and the streets inconveniently laid out. It has two ancient churches, one of which is of large dimensions; and an hospital, founded in the eleventh century. Calicoes, waxcloths, nails, brandy, and vinegar are manufactured; a considerable trade is carried on in corn; and wine, wood, hemp, and wool are forwarded to Lyons and the south of France. In 1814, a hotly contested action was fought here between Napoleon and the allies. Pop. 4809.

BARTAN, or BARTIN, a town, Asiatic Turkey, pashalic of Anatolia, built at the junction of two rivers, the Kójahnás and the Ordeïri, and near where the united streams fall into the Black Sea; lat. 41° 46′ N.; lon. 32° 10′ E. It is surrounded by a ruinous wall, and consists of about 650 houses, and is built on two low hills of cretaceous limestone. The houses, on account of the marshy character of the surrounding country, are all built of two stories, the upper one of which alone is inhabited. For the same reason, the streets are carefully paved with large limestone slabs. It has twelve mosques, five khans, and four baths; and carries on a lively trade with Constantinople, from which it imports various kinds of merchandise, sending in exchange hemp, fruit, and building timber. Pop. 10,000.

BARTFA, or BARTFELD, a free town, Hungary, county of Saros, 156 miles N.E. of Pesth, on a rising ground near the banks of the Tepla and Lauka. It is one of the oldest towns in Hungary, and is well built; has several Roman Catholic churches, a Lutheran church and school, a Franciscan monastery, military academy, hospital, theatre, paper-mills, potteries, &c. Some acidulous chalybeate springs and baths, near the town, are much frequented. The trade in wine, hemp, linen cloth, and woollen yarn is considerable. Pop. 5303.

BARTH, HEINRICH, a distinguished geographer and African traveller, was born at Hamburg, Feb. 16, 1821. He received his education partly in his native town, and partly at the University of Berlin, where he graduated as Ph.D. in 1844. Having determined to explore all the countries bordering on the Mediterranean, he set out with this intention in the beginning of 1845. After his return in the end of 1847, he wrote an account of his travels, which he published with the title Wanderungen durch die Küstenländer des Mittelmeeres (vol. i. Berlin, 1849). In less than two years after his return from his first travels, he was invited by the English government to join Dr. Overweg in accompanying the expedition that was about to proceed under Mr. Richardson to Central Africa. The expedition having landed at Tripoli in the end of 1849, set out thence for the interior of Africa, in February, 1850. His explorations, which extended over an area of about 2,000,000 square miles, hitherto almost entirely unknown, were continued for more than five years, in spite of the death both of Mr. Richardson and Dr. Overweg, and he did not again return to Tripoli till October 13, 1855. The chief geographical results of these travels consist in the light they throw on the true nature of the Desert of Sahara, in showing that the eastern upper branch of the Niger, the Benuwe, is not connected with Lake Tchad, and in the determination of the course of the Niger between Say and Timbuctoo. The work which he wrote on these travels, entitled Reisen und Entdeckungen in Nord und Central Afrika, was published at Gotha in 1857–8. Immediately after its publication, he set out upon a new series of travels through the countries bordering on the Mediterranean, the last of which occupied the summer of 1865. He died 25th November, 1865. Besides the works mentioned, he published an important work on the languages of the countries he had visited in Africa, entitled Sammlung und Verarbeitung central-afrikanischer Vokabularien (Gotha, 1862–3), but it was left unfinished.

BARTHÉLEMY, JEAN JACQUES, born January 20, 1716, at Cassis, near Marseilles, in what was formerly Provence, received a good education from the fathers of the oratory at Marseilles, and was about to prepare himself, under the Jesuits, for holy orders; but becoming disgusted with his teachers, he declined all offers of clerical promotion, and only accepted the title of *abbé*, in order to show that he belonged to this class. From his youth he loved the study of the ancient languages, even the most ancient Oriental tongues, and antiquities more particularly. His indefatigable industry and acuteness soon enabled him to communicate to the learned new discoveries in this branch of study, among which the Alphabet of Palmyra, published by him in 1754, holds a principal place. In 1747 he was chosen member of the Academy of Inscriptions at Paris, after having been associated, on his arrival in Paris (1744), with the inspector of the Royal Cabinet of Medals. About this time, he became acquainted with the Count Stainville (afterwards the minister Choiseul), who was on the point of departing as ambassador for Rome, and invited Barthélemy to accompany him thither. Having been appointed director of the Cabinet of Medals in 1753, he accepted the offer, and went in 1754 to Rome. He travelled through Italy, collected antiquities, and occupied himself, after his return, with learned works, and with the arrangement of the cabinet which had been intrusted to his care, and to which he added a great

number of costly and rare medals. Among his works, none are so distinguished for learning and beauty of description as the Travels of the Younger Anacharsis in Greece, on which he had laboured thirty years. He himself was modest enough to call this an unwieldy compilation, whilst all the learned men of France and foreign countries received it with the greatest applause. Barthélemy, in his advanced age, resolved to compose a complete catalogue of the Royal Cabinet of Medals, but was interrupted in 1788 by the storms of the revolution; during which he remained tranquil, taking no part in the public disturbances. In 1789 he received a place in the Académie Française. The revolution deprived him of the greatest part of his income; but he bore this loss with calmness. August 20, 1793, he was accused, by a clerk of the national library, of aristocracy, and, September 2, arrested; but he was soon after set at liberty, and re-admitted among the number of librarians. This event had the most injurious effects upon his weak health. When the chief librarian of the national library, the notorious Carra, was executed, October 31, 1793, Barthélemy received the offer of his place; but he refused it, with the hope of passing his few remaining days in tranquillity. He died April 30, 1795, with the reputation of an honest man, and a highly-learned and distinguished author.

BARTHEZ, PAUL JOSEPH, one of the most learned physicians of France in the eighteenth century, was born at Montpellier, December 11, 1734. He completed his medical studies and received the degree of M.D. in 1753, and in 1754 he came to Paris, where the cure of the Count of Perigord introduced him to notice. He was received into the society of Barthélemy, Caylus, Hénault, Mairan, and D'Alembert. Two memoirs which he presented to the Académie des Inscriptions et des Belles-Lettres, obtained the first prizes. He took part in the Journal des Savans, and in the Encyclopédie. Recalled to Montpellier, he founded there a medical school, which acquired a reputation throughout all Europe. He also published there his Nouveaux Élémens de la Science de l'Homme (Montpellier, 1778; 2d augm. ed., Paris, 1806, 2 vols.), which were translated into most of the European languages. But his ambition did not find sufficient food at Montpellier; he therefore returned in 1780 to Paris, where he was appointed by the king consulting physician, and by the Duke of Orleans his first physician. He was a member of almost every learned society. His advice upon important cases was sought for from every quarter. The revolution deprived him of the greatest part of his fortune and his place. Napoleon, who understood how to discover merit, brought him forth again, and loaded him, in his advanced age, with dignities. He died October 15, 1806. His name will be remembered, in and out of France, with the same respect as those of Boerhaave, Hoffmann, Sydenham, Cullen, and Brown. Among his numerous writings is the one entitled Nouvelle Mécanique des Mouvemens de l'Homme et des Animaux. Barthez was a Doctor of Laws, and counsellor of the Cour des Aides.

BARTHOLINE.—1. THOMAS, a celebrated Danish physician, born at Copenhagen in 1616, after studying at the university there, visited the most celebrated seats of learning in Europe, and returned in 1647 to his native place, where he obtained first the chair of mathematics, and then that of anatomy. He made several important discoveries, and published many valuable works, one of which, his Anatomia, has been reprinted in various countries of Europe, and continued to be the text-book in common use, till it was superseded by that of Verheyen in 1693. He died in 1630.——2. THOMAS, son of the former, born in 1659, studied law at the universities of Copenhagen, Leyden, Paris, Leipzig, and Oxford, became professor of history and civil law, and obtained several other important offices, and published several valuable works on Danish antiquities. He died in 1690.

BARTHOLOMEW (*son of Tolmai*), the apostle, is probably the same person as *Nathanael*, mentioned in the Gospel of St. John as an upright Israelite, and one of the first disciples of Jesus. The derivation of his name and descent from the family of the Ptolemies is fabulous. He is said to have taught Christianity in the south of Arabia, into which, according to Eusebius, he carried the Gospel of St. Matthew in the Hebrew language. Chrysostom mentions that he preached in Armenia and Natolia, and a later writer of legends says that he suffered crucifixion at Albania Pyla (now *Derbend*, in Russia). The ancient church had an apocryphal gospel bearing his name, of which nothing has been preserved.

BARTHOLOMEW, ST., one of the Caribbee Islands, in the West Indies, belonging to Sweden, about 24 miles in circumference; lon. 63° 0′ W.; lat. 17° 50′ N.; population about 3000. It produces tobacco, sugar, cotton, indigo, and cassava, with some excellent woods and limestone. All the fresh water which can be procured is saved in cisterns. The island is encompassed by formidable rocks, which render it dangerous of access to shipping. Its chief products for exportation are drugs and lignum vitæ. The only town is Gustavia or St. Bartholomew, and the only harbour is Le Carenage, near Gustavia. ——There are two other islands of the same name in the South Pacific Ocean. One lies in lon. 167° 23′ E.; lat. 15° 41′ S.; the other in lon. 221° 25′ W.; lat. 8° 13′ S.

BARTHOLOMEW FAIR, a celebrated fair formerly held in West Smithfield, London, on St. Bartholomew's Day (Aug. 24, O.S.), but now abolished. It was first established in the reign of Henry I., and like all these institutions of the middle ages was originally devoted mainly to the purposes of business and traffic, one of the principal articles of merchandise being cloth. Sports, exhibitions, and popular amusements of various kinds, were of course also introduced, and of these the mysteries and miracle plays of the church formed one of the most favourite entertainments. In process of time, the transacting of serious business was gradually superseded, and the chief attractions of the fair consisted in theatrical exhibitions, wild-beast shows, the feats of jugglers, mountebanks, and the like. Latterly, even these had declined miserably in quality, and the whole institution came to be regarded as a nuisance, subversive of order and morals, and a rendezvous for all the riot and blackguardism of London. After many discussions on the propriety of abolishing the fair, this was finally effected in 1855.

BARTHOLOMEW'S DAY, ST., a feast of the Church of Rome, celebrated in honour of St. Bartholomew. The horrid slaughter of the Huguenots, in France, took place on St. Bartholomew's Day, under the reign of Charles IX., in 1572. The causes which produced it may be found in the articles HUGUENOTS, GUISE, and CONDÉ. After the death of Francis II., Catharine de' Medici had assumed the regency for her son Charles IX., then only ten years old, and was compelled, in spite of the opposition of the Guises, to issue an edict of toleration in favour of the Protestants. The party of the Guises now persuaded the nation that the Catholic religion was in the greatest danger. The Huguenots were treated in the most cruel manner; Prince Condé took up arms; the Guises had recourse

to the Spaniards, Condé to the English, for assistance. Both parties were guilty of the most atrocious cruelties, but finally concluded peace. The queen-mother caused the king, who had entered his fourteenth year, to be declared of age, that she might govern more absolutely under his name. Duke Francis de Guise had been assassinated by a Huguenot, at the siege of Orleans; but his spirit continued in his family, which considered the Admiral Coligny as the author of his murder. The Huguenots soon found that the queen-mother still hated them; and Condé and Coligny therefore kept themselves on their guard. The king (see CHARLES IX.) had been persuaded that the Huguenots had designs on his life, and had conceived an implacable hatred against them. Meanwhile, the court endeavoured to gain time, in order to seize the persons of the prince and the admiral by stratagem, but was disappointed, and hostilities were renewed with more violence than ever. In the battle of Jarnac, 1569, Condé was made prisoner and shot by the Captain de Montesquieu. Coligny collected the remains of the routed army; the young prince Henry de Béarn (afterwards Henry IV., king of Navarre and France), the head of the Protestant party after the death of Condé, was appointed commander-in-chief, and Coligny commanded in the name of the prince Henry de Condé, who swore to revenge the murder of his father. But he was destitute of means, and was unsuccessful. The advantageous offers of peace at St. Germain-en-Laye (August 8, 1570) blinded the chiefs of the Huguenots, particularly the Admiral Coligny, who was wearied with civil war. The king appeared to have entirely disengaged himself from the influence of the Guises and his mother: he invited the old Coligny, the support of the Huguenots, to his court, and honoured him as a father. The most artful means were employed to increase this delusion. The sister of the king was married to the Prince de Béarn (Aug. 18, 1572), in order to allure the most distinguished Huguenots to Paris. Some of his friends endeavoured to dissuade the admiral from this visit; but he could not be convinced that the king would command an assassination of the Protestants throughout his kingdom. Aug. 22, a shot from a window wounded the admiral. The king hastened to visit him, and swore to punish the author of the villany; but, on the same day, he was induced by his mother to believe that the admiral had designs on his life. 'God's death!' he exclaimed: 'kill the admiral; and not only him, but all the Huguenots; let none remain to disturb us!' The following night, Catharine held the bloody council which fixed the execution for the night of St. Bartholomew, August 24, 1572. After the assassination of Coligny, a bell from the tower of the royal palace, at midnight, gave to the assembled companies of burghers the signal for the general massacre of the Huguenots. The Prince of Condé and the King of Navarre saved their lives by going to mass, and pretending to embrace the Catholic religion. By the king's orders, the massacre was extended through the whole kingdom; and if, in some provinces, the officers had honour and humanity enough to disobey the orders to butcher their innocent fellow-citizens, yet instruments were always found to continue the massacre. This horrible slaughter continued for thirty days, in almost all the provinces: the victims are calculated at 30,000. At Rome, the cannons were discharged, the pope ordered a jubilee and a procession to the church of St. Louis, and caused the Te Deum to be chanted. Those of the Huguenots who escaped fled into the mountains and to Rochelle. The Duke of Anjou laid siege to that city, but, during the siege, received the news that the Poles had elected him their king. He concluded a treaty, July 6, 1573, and the king granted to the Huguenots the exercise of their religion in certain towns. The court gained nothing by the massacre of St. Bartholomew (called, in French ultra papers, in 1824, *une rigueur salutaire*). The Huguenots were afterwards more on their guard, and armed themselves against new attacks. (See Hist. de la Ste. Barthélémi d'après les Chroniques, les Mémoires et les Manuscrits du Tems, Paris, 1826. The massacre of St. Bartholomew is, in this work, attributed to Catharine de' Medici. See also Schiller's History of the Troubles in France, until the death of Charles IX.)

BARTHOLOMEW'S HOSPITAL, ST., one of the greatest hospitals of London; formerly the priory of St. Bartholomew, and made an hospital by Henry VIII. in 1547. It contains 676 beds, and, on an average, 6000 patients are annually admitted to the hospital, while about 100,000 out-patients are relieved by it.

BARTLETT, WILLIAM HENRY, a well-known artist, was born at Kentish Town, London, on 29th March, 1809, and afterwards served an apprenticeship with the distinguished architectural antiquary Mr. John Britton, who conceived a high opinion of his pupil's powers, and employed him to make drawings for his Cathedral Antiquities and Picturesque Antiquities of English Cities. Mr. Bartlett subsequently travelled extensively abroad, and the illustrative works which he published, descriptive of the countries visited by him, obtained great success with the public. The engravings in these are taken from sketches by his own pencil, and display a wonderful beauty and richness of execution. Among those more especially deserving of notice are his works on Switzerland, Syria, Egypt, and the United States of America. He died on the voyage from Malta to Marseilles, on 25th September, 1854.

BARTOLINI, LORENZO, a celebrated Italian sculptor, was born at Florence about 1778. In his youth he was a pupil of Desmarets, a French painter, and made considerable progress under him; but the bent of his genius leading him rather to handle the chisel than the brush, he proceeded to Paris, and entered the studio of the sculptor Lemot. He early established his reputation by the execution of a bas-relief, Cleobis and Biton. Napoleon intrusted him with a multitude of works, among others a colossal bust of the emperor placed above the entrance of the French Institute, and a magnificent statue of him, which, in consequence of the events of the restoration, was never delivered to government, and is now in America. On the fall of the empire he returned to Florence, where he continued to exercise his profession. Among his greater works may be mentioned his groups of Charity, and Hercules and Lycas, and the beautiful monument in the cathedral of Lausanne, Switzerland, erected in memory of Lady Stratford Canning, who died there in 1817. Bartolini ranks next to Canova among modern Italian sculptors. He died at Florence in 1850.

BARTOLOMMEO, FRA. See BACCIO DELLA PORTA.

BARTOLOZZI, FRANCESCO, a distinguished engraver, born at Florence in 1725, or, according to others, in 1730, where he learned the art of drawing from Hugfort, Ferreti, and others. In Venice, in Florence, and Milan, he etched several pieces on sacred subjects, and then went to London, where he received great encouragement, and accommodated himself entirely to the national taste, so as even to work in the popular red dotted manner. His pieces were so universally sought for, that a complete collection of them was valued at £1000. He was elected a

member of the Royal Academy of Arts, in London. After forty years' residence in London, he went to Lisbon, to engrave on copper the portrait of the regent, where he received, in 1807, the order of Christ. He died there in April, 1813. With accuracy of design, he united great delicacy of execution. Among his best engravings is the death of Lord Chatham, after Copley, and the Virgin and Child. His works, among which are imitations in etching of drawings of the great masters, amount to more than 2000.

BARTOLUS, one of the most celebrated lawyers of modern times, was born at Sasso Ferrato, in the Marches of Ancona, about 1313; studied and took his degree of Doctor of Law at Bologna, became professor, first at Pisa, and then at Perugia, was ennobled and honoured with other distinctions and privileges by the emperor Charles IV., and not only published many important works in law, in which his opinions were long deemed almost oracular, but distinguished himself in various other branches of knowledge. His excessive labours appear to have undermined his constitution, and he died at Perugia in 1356.

BARTON, BERNARD, known as the Quaker poet, one of the minor English poets of the present century, was born in London, 31st January, 1784. In 1806 he removed to Woodbridge, in Suffolk, where he entered into a business in coals and corn, along with a brother of his wife; but his partner dying, he gave up this occupation, and in 1810 became clerk in a bank at Woodbridge, a situation which he held till not long before his death. He died of heart disease on the 19th February, 1849, leaving a daughter, his only child. In 1824 a reading society founded by him at Woodbridge presented him with £1200, and he afterwards received a pension of £100 through Sir R. Peel. His first appearance as an author was in 1812, when he published a small volume of poems under the title of Metrical Effusions, which led to a correspondence with the poet Southey. This was followed in 1818 by Poems by an Amateur, and in 1820 by a volume entitled simply Poems, which became popular, and gained him the friendship of Lamb and Byron. Of his other productions the chief were Napoleon, and other Poems (1822); Poetic Vigils (1824); Devotional Verses (1826); A New-year's Eve, and other Poems (1828); besides many contributions to the annuals and magazines. His last work was Household Verses (1845). His daughter Lucy published Selections from the Poems and Letters of Bernard Barton, in 1849. His poetry, though deficient in force, is pleasing, fluent, and graceful, animated by a love of nature, and by a pure religious spirit.

BARTON, ELIZABETH, a country girl of Aldington, in Kent (commonly called the Holy Maid of Kent), who was used as an instrument, by the Catholics and adherents of Queen Catherine, to excite the English nation against the proposed divorce of Henry VIII. from his first wife, and the apprehended separation of the English church from Rome, with which the king then threatened the pope. Her delirious utterances, in a violent nervous illness, were made use of by the parson of Aldington, Richard Maister, and by a canon of Canterbury named Bocking, to persuade her that she was a prophetess inspired by God, and destined to prevent this undertaking of the king. Among other things she prophesied that Henry, if he persisted in his purpose of divorce and second marriage, would not be king for seven months longer, and would die a shameful death, and be succeeded by Catherine's daughter. Her revelations, published and distributed by the monk Dering, produced such a fermentation among the people, that Henry ordered the apprehension and examination of Elizabeth and her accomplices before the Star-chamber. After they had there confessed the imposture, they were condemned to make a public confession and to imprisonment; and the Maid, Bocking, Maister, Dering, and three others were afterwards adjudged guilty of high treason, for a conspiracy against the king, and executed April 21, 1534. The venerable Bishop Fisher and Sir Thomas More were among those accused of holding correspondence with the Holy Maid; and the former was pronounced guilty of misprision, or concealment, of treason in consequence.

BARTON-UPON-HUMBER, a town, Lincolnshire, on the Humber, with a trade in corn, flour, malt, and manufactures of rope and sacking, bricks, tiles, and pottery. It is an ancient place, and contains two old churches, one of which furnishes an undoubted specimen of Anglo-Saxon architecture. Pop. 3797.

BARUCH (literally *blessed*), is used as the name of several individuals, of whom the most celebrated was the son of Neriah, scribe and assistant to the prophet Jeremiah. During the reign of Jehoiakim, about B.C. 607, Jeremiah, while in prison, having been divinely commissioned to put all his prophecies in writing, dictated them to Baruch, who inserted them in a roll, which he was ordered to read both within and at the entrance of the temple. Jehoiakim on hearing its commencement cut it in pieces and threw it into the fire. At the captivity, after the destruction of Jerusalem, Jeremiah and Baruch were permitted to remain in Palestine, but were afterwards carried into Egypt, B.C. 588. The subsequent life of Baruch is little known. According to one tradition he died in Egypt; according to another, he quitted Egypt for Babylon, and died there twelve years after Babylon was destroyed. One of the apocryphal books bears the name of Baruch. The Council of Trent gave it a place in the canon, but its authenticity was not admitted either by the ancient Jews or the early Christian fathers.

BARYTA, one of the earths; from *barys*, heavy, on account of the high specific gravity of its compounds. It is procured either from the native sulphate of barium, by exposing its powder to a red heat with charcoal, and by forming from the resulting sulphuret a nitrate, which is decomposed by heat; or from the native carbonate, by dissolving it in nitric acid, and, in like manner, subjecting it to heat. Thus obtained, baryta has a specific gravity of 4, is of a gray colour, has a caustic taste, and slakes on exposure to the air, like lime, falling to powder from the absorption of water. It is soluble in 25 parts of water, at 60°, and in the proportion of nearly half its weight at 212°. The solution, on cooling, affords prismatic crystals. Its watery solution possesses strong alkaline properties, changing the vegetable blues to green, and acquiring a film upon its surface, when exposed to the air, from the absorption of carbonic acid. It operates as a virulent poison when taken into the stomach. To the flame of alcohol it imparts a greenish yellow colour, which, together with its great solubility in water, serves to distinguish it from the other earths. It is used in chemical analysis, for decomposing minerals such as silicates, and thus rendering them soluble in acids or water.

Baryta was decomposed by the agency of galvanism, and ascertained to be the oxide of a peculiar metal, to which Sir Humphry Davy gave the name of *barium*. Barium has a white colour, with a metallic lustre, resembling that of silver. Exposed to the air or thrown into water, it absorbs oxygen, and is converted into baryta.

Baryta combines with the acids, and forms a variety of salts, two of which, the carbonate and the sulphate, are found abundantly in nature. The first

of these is called, in mineralogy, *Witherite*, from Dr. Withering, its discoverer. It is commonly fibrous or bladed in its structure, occasionally including small cavities lined with minute crystals. It is whitish, translucent, and glistening. Specific gravity, 4·3. It is composed of baryta 78, and carbonic anhydride 22. Like all the other salts of baryta (with one exception), the carbonate is a virulent poison, and has often proved fatal to domestic fowls and animals which have accidentally swallowed it, about the mines where it occurs. Its principal localities are in the north of England, where it is found in lead mines: it also occurs in Styria, Salzburg, and Siberia. It is used to obtain the pure baryta, and those salts of this earth which are employed as chemical tests, and for the purposes of scientific illustration.

The sulphate of barium, called, in mineralogy, *heavy spar*, is found abundantly in almost every country, usually accompanying galena, or common lead-ore, of which it frequently forms the gangue. It is often beautifully crystallized under a variety of forms, derived from a right rhombic prism of 101° 42′, and 78° 18′, but is more generally lamellar or compact. It presents numerous colours, of which white is the most frequent. It is translucent, and sometimes transparent, capable of being scratched by the knife, and of a specific gravity of 4·7. Like the artificial sulphate of barium, it is insoluble, and is the only salt of this earth which is not poisonous. It consists of 67 parts of baryta and 33 sulphuric anhydride. It is employed, though less extensively, for the same purposes as the carbonate, and was formerly used by Mr. Wedgewood in the manufacture of his beautiful jasper ware.

A fibrous variety of heavy spar, called *Bolognian stone*, which occurs, imbedded in small nodular masses, in a marl near Bologna, has the remarkable property of becoming phosphorescent by calcination.

The *artificial* sulphate of barium formed by adding sulphuric acid to any soluble compound of barium, is a heavy white powder insoluble in acids and alkalies, and is the usual test by which barium is recognized. It is also employed for painting in water-colours, under the name of *permanent white*. The same substance is much valued for marking bottles in chemical laboratories, where the acid vapours destroy common ink, and for labelling articles kept in cellars and moist places. In order to be applied, it is mixed up with spirits of turpentine and linseed-oil, to the consistence of common paint, when it is laid on with a brush. If a black marking material is preferred, this may be rendered so by the addition of a little lamp-black.

The *nitrate of barium* is formed by dissolving the native carbonate in diluted nitric acid, and crystallizes on evaporation. It is soluble in 10 or 12 parts of water, at 60°, and in 3 or 4 parts at 212°.

The *chloride of barium*, in like manner, is produced by submitting the carbonate to the action of dilute hydrochloric acid. It is much more soluble than the nitrate. The chloride of barium is employed with advantage as a medicine, in the treatment of scrofulous diseases, though, from its poisonous nature, great caution is required in its administration. With the other acids barium forms compounds which are insoluble in water, but dissolves more or less readily in hydrochloric acid.

When baryta is raised to a dull red heat in the air it combines with an additional quantity of oxygen, and is converted into the barytic peroxide. If this compound be then heated to full redness the additional quantity of oxygen is given off and baryta remains. By taking advantage of this property it was hoped that oxygen might be got continuously from the air on a sufficient scale for manufacturing purposes. But although the process succeeds, the expense attending the working of it has hitherto prevented it being employed as a convenient source of oxygen, and even in the laboratory it has not superseded the potassic chlorate.

BASAITI, Marco, a celebrated early painter of Greek extraction, born in the Friuli about the middle of the fifteenth century, settled in Venice, where several of his paintings, remarkable for the brilliancy of their colouring, and distinguished by other excellences, are seen. His master-piece, now in the Venetian academy, is the Calling of St. Andrew and St. Peter. He was the contemporary, and not unfrequently the successful rival, of Gian Bellini.

BASALT. See Trap-Rocks.

BASCINET, or Basnet, a light helmet, sometimes with, but more frequently without a visor, and worn by knights at times when, though apprehension of danger was not imminent, it might not have been safe to be altogether unarmed. It resembled a basin, and hence its name. It was in general use for English infantry in the reigns of Edward II. and III., and Richard II., and is frequently mentioned in parliamentary and other public records.

BASE, in architecture, see Architecture; in chemistry, see Chemistry.

BASE, or Basis, a term in tactics, first introduced into military language by Heinrich von Bülow, who laboured to reduce war to mathematical principles, and to give more certain rules to the commander. By *basis*, he understands a tract of country well protected by fortresses, and from which the operations of the army proceed. The line on which these operations are executed he calls the *line of operation;* the fortresses from which the operations begin, the *subject;* the point to be first carried, the *object*. Thus, in an offensive war of France against South Germany, supposing Prussia and Switzerland to be neutral, the Rhine, from Basel to Carlsruhe, would have been the basis; Strasburg, the subject; Ulm, or Ratisbon, the object; and the road from Strasburg to these places, the line of operation. As Bülow thought magazines indispensable, the security of the line of operation against all attacks from the side seemed to him likewise indispensable, and he laid down the principle that both the lines drawn from the ends of the basis to the object, ought to meet there in a right or an obtuse angle, the last being preferable. The novelty and importance of the subject, and the severity with which Bülow criticized his opponents, gave rise to a violent dispute. In 1814, the subject was discussed in the Fragmente aus den Grundsätzen der Strategie, erläutert durch die Darstellung des Feldzugs in Deutschland, 1796; a most valuable work, composed by the Archduke Charles of Austria. He adopts many of the ideas of Bülow, and rejects others; and, on the whole, establishes the theory of the basis on such grounds, that every unprejudiced military man will be disposed to admit it. He also maintains, that the basis (according to his definition, a straight line, which unites several points at which the stores of the army are collected) must be covered. It ought, since the operation on one road would be dangerous, to include, if possible, several fortified places, connected by easy communications, and to run parallel with the basis of the enemy. If the troops move too far from the basis a new one should be formed. The archduke explains his principles on a supposed theatre of war in the south of Germany, and by the war which actually took place in that country in 1796, in which he distinguished himself so much. Several of the European wars have shown the correctness of this theory, which has been acted on, more or less, by generals in

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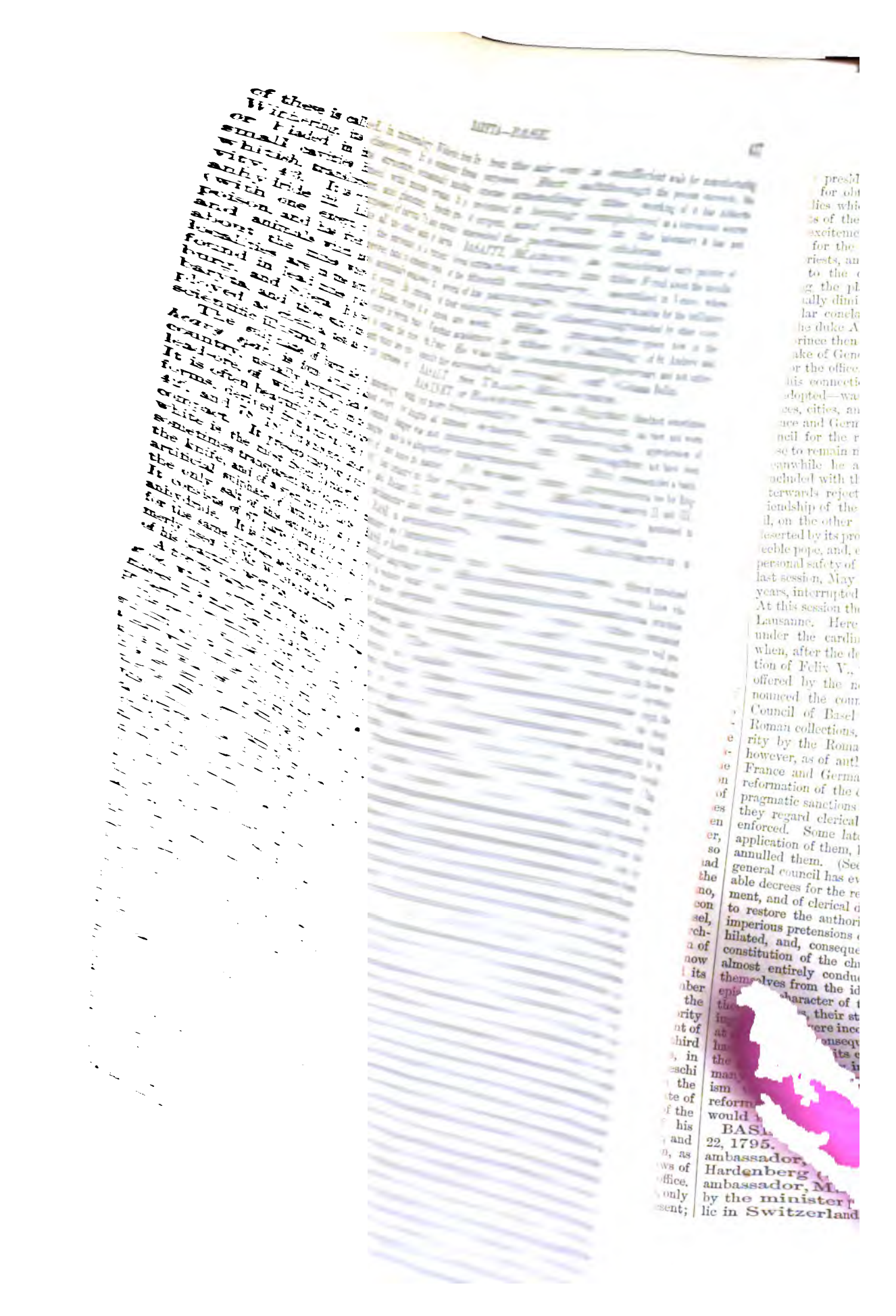

all ages, and the neglect of which has generally been attended with suffering and defeat. Thus the Prussians, in 1792, advanced without paying regard to the fortresses of Mentz, Thionville, Landau, &c., on one line of operation; and were nearly destroyed at Valmy; and, for the same reason, the army of Jourdan, in 1796, was almost entirely ruined, after some unfortunate engagements. So the army of Napoleon perished in Russia, because he had not formed, before advancing to Moscow, a new basis on the Dnieper. The war in Spain, also, westward of Madrid, consisted only of detached movements of large columns, which were ineffectual, on account of the want of a proper communication. The allies also were enabled to march from all sides against Napoleon at Leipsic, in consequence of his having neglected to form a basis at Dresden; and they themselves were several times exposed to the greatest danger in France, from a similar neglect, when nothing but the boldness of Blücher, and the spirit of the troops, saved them. It may be objected, that Napoleon owed his greatest glory to campaigns in which he entirely disregarded the basis; as those of 1805 and 1809, against Austria, and his previous campaigns in Italy; but one single great and decisive battle lost would have punished severely his neglect of this principle. And, moreover, there is one rule still more important than those of tactics—to act according to the circumstances and the character of the enemy, and to bring on decisive results by energetic measures, rather than to moulder away in inaction. We may remark, also, that the conquest of the capital of a large state is always a most important object, and should be aimed at as speedily as the rules of tactics will allow.

BASEDOW, JOHN BERNHARD, often called by himself *Bernard von Nordalbingen;* one of the most famous of the German teachers, who, in the latter half of the last century, wrote so much on education, was born September 11, 1723, died July 25, 1790. He had in Dessau an institution for education, called Philanthropinon, which the prince of this territory favoured. The chief features of Basedow's system are the cosmopolitan character which he endeavoured to instil into his pupils, and the full development of the faculties of the young at which he aspired, in pursuance of the notions of Locke and Rousseau. With Salzmann, Campe, &c., he established some good institutions, and particularly deserves credit on account of his efforts for the education of the lower classes.

BASEL, or BASLE (Fr. *Bâle*), one of the largest cities of Switzerland, and capital of canton Basel City, 43 miles N. of Bern. It consists of two parts, pleasantly situated on opposite sides of the Rhine, and communicating by a long wooden bridge; is walled, and though irregular, tolerably well built; and has an ancient cathedral, conspicuous both by its elevated site and lofty towers, and justly regarded as one of the finest ecclesiastical edifices in Switzerland. Basel was formerly a free imperial city, but joined the Swiss Confederacy in 1501. Buxtorf, Wetstein, Hermann, the Bernouillis, and Euler were born in Basel. Erasmus also lived there several years, and lies buried in the cathedral. Among the institutions of the city are the university, founded in 1459; various collections of paintings, a seminary for missionaries, and a German Bible society, which prints stereotype Bibles, and distributes several hundred copies of every edition to the poor. In 1849 a large museum was completed, which contains the university library (now consisting of about 80,000 vols., with 4000 manuscripts), and all the collections belonging to the town. At one time it was a remarkable peculiarity of Basel, that the clocks were an hour in advance of those of other places; and the streets of the city were not lighted until March, 1826. The manufactures are extensive, consisting principally of ribbons, and more partially of other silk goods, cotton prints, linen, gloves, leather, jewelry, and turnery ware. The advantageous position of Basel on the Rhine, a little below the point where it becomes navigable, and at the terminus of the French and German railways, has made it the emporium of a most important trade. Pop. in 1870, 44,834.

BASEL, COUNCIL OF. This council was announced at the Council of Constance, and convoked by Pope Martin V., and his successor Eugenius IV. It commenced its sittings Dec. 14, 1431, under the presidency of the cardinal legate Juliano Cesarini of St. Angelo. The objects of its deliberations were to extirpate heresies (that of the Hussites in particular), to unite all Christian nations under the Catholic church, to put a stop to wars between Christian princes, and to reform the church. But its first steps towards a peaceable reconciliation with the Hussites, against whom Juliano had unsuccessfully published a crusade, were displeasing to the pope, who authorized the cardinal legate to dissolve the council. That body opposed the pretensions of the pope, with severe animadversions on his deceitful conduct, and his neglect of the welfare of the church, and, notwithstanding his repeated orders to remove to Italy, continued its deliberations under the protection of the emperor Sigismund, of the German princes, and of France. In order to secure itself against the attacks of Eugenius IV., it re-enacted the decrees of the Council of Constance concerning the power of a general council (in matters of faith, of schism, and of reformation), to command the pope, as well as all Christendom, and to punish the disobedience of the clergy, and even of the pope, by virtue of its judicial character as the representative of the Universal Church. It likewise pronounced all the doings and remonstrances of the pope against its proceedings of no force, and began a formal process against him, after he had issued a bull for its dissolution; appointed him, term after term, to appear before its tribunal, and exercised as much as possible the papal prerogatives in France and Germany. Meanwhile it concluded, in the name of the church, a peace with the Hussites (whose deputies appeared, Jan. 6, 1433, with 300 horse, in Basel, by which the use of the cup in the communion was granted to them. This peace was ratified, Nov. 20, 1433, by the Calixtines, the most powerful and finally prevailing party of the Hussites. The council deviated on this point, indeed, from the decrees of the Council of Constance, but was obliged so to do, in order to assist its most faithful protector, the emperor Sigismund, to the acquisition of Bohemia by this compromise with the Hussites, who were not to be subdued by force. The emperor, in return, effected the reconciliation of the council with Eugenius IV., who, urged by an insurrection in the papal territory, and by the fear of losing all authority in Germany and France, solemnly confirmed its decrees in a bull, dictated by the council, and accepted at the sixteenth session (Feb. 5, 1434). Proud of this victory over the pope, it attempted to interfere in the quarrels of the German princes; but was reminded by Sigismund, who protested against its intermeddling in the affairs of the crown, of its proper point—the reformation of the church. Towards the limitation of the power of the pope, in accordance with the ancient constitution of the church, it had already made an important step by depriving him of the disposal of the prebends of cathedral and collegiate churches, which had been obtained by his

predecessors; by restoring to the chapters the free election of their officers, and by obliging the pope to confirm them gratuitously. It proceeded to the reformation of the clergy, by ordaining that the clergymen who maintained concubines, and the prelates who received money for permitting it, should be punished; that the excommunicated should not incur the penalties of their sentence before its publication; that interdicts should never be granted at the request of single individuals; and that repeated appeals should not be allowed, on account of their complaints (twentieth session, Jan. 22, 1435); that the *annates*, the sums paid for the *pallia*, &c., should be regarded as simoniacal, and should not, under any pretext, be demanded or paid in future; that the divine service, the mass, and the canonical hours should be regularly observed by the clergy of each class; that disturbances of public worship should be prevented by a good ecclesiastical police; that the Feast of Fools, and all irreverent celebrations customary in the church about Christmas, should be abolished (twenty-first session, June 9, 1435). In the twenty-third session (March 25, 1436) the form of election, the confession of faith, and the official oath of each pope, by which he bound himself to obey the decrees of the council, and the annual repetition of the same, were provided for; all preferment of the relations of a pope was forbidden, and the College of Cardinals was limited to twenty-four prelates and doctors of all nations, who should be elected by the free votes of the college, should be entitled to half of the revenues of the States of the Church, should watch over the pope, and always sign his bulls. They granted him only the right to dispose of the prebends belonging to the diocese of Rome, and abolished the investiture of church preferments in reversion. In the twenty-sixth session it again summoned him to appear, on account of his disobedience of its decrees, declared him guilty of contumacy, and, after Eugenius had opened his counter-synod at Ferrara, decreed his suspension from the papal chair, in the thirty-first session (Jan. 24, 1438). In the same session it forbade appeal to Rome, without resort to the intermediate jurisdictions, left to the papal disposition but one out of ten, and two out of fifty prebends of a church, and destined the third part of all canonries which might become vacant to men who had taken regular degrees. The removal of Eugenius, however, seemed, on account of the strength of his party, so impracticable, that some prelates, who till then had been the boldest and most influential speakers in the council (for example, the cardinal legate Juliano, and the great canon Nicolaus of Cusa, Archdeacon of Liége, with the most of the Italians), left Basel, and went over to the party of Eugenius. The Archbishop of Arles, Cardinal Louis Allemand, a man of superior spirit, courage, and eloquence, was now made first president of the council, and directed its proceedings with much vigour. Although its number was diminished, its most powerful protector, the emperor Sigismund, deceased, and its authority doubted by several princes and nations, on account of its open rupture with the pope; yet, in the thirty-third session (May 16, 1439), after violent debates, in which the Archbishop of Palermo, Nic. Tudeschi (known, under the name of *Panormitanus*, as the greatest canon of his time), who was the delegate of the King of Arragon and Sicily, took the part of the pope,—it declared Eugenius, on account of his obstinate disobedience of its decrees, a heretic, and formally deposed him, in the following session, as guilty of simony, perjury, violation of the laws of the church, and bad administration in his office. At this session (the thirty-fourth, June 25, 1439), only two of the Spanish and Italian members were present; but the president adopted a spirited and effectual method for obtaining the decree. He ordered the holy relics which existed in Basel, to be placed in the seats of the absent bishops, and produced such a strong excitement in the council, which still consisted of 400, for the most part French and German prelates, priests, and doctors, that it unanimously consented to the deposition of Eugenius. Notwithstanding the plague, then raging in Basel, which continually diminished its number, it proceeded, in a regular conclave (Nov. 17 of the same year), to elect the duke Amadeus of Savoy to the papal chair. This prince then lived in retirement at Ripaglia, on the Lake of Geneva, and seemed particularly qualified for the office, on account of his piety, his riches, and his connections. Felix V.—this was the name he adopted—was acknowledged by only a few princes, cities, and universities. The chief powers, France and Germany, assented to the decrees of the council for the reformation of the church, but they chose to remain neutral in the contest with Eugenius. Meanwhile he acquired new credit by the union concluded with the Greek deputies at Florence (but afterwards rejected by the Greek church) and the friendship of the emperor Frederic III. The council, on the other hand, denounced by Eugenius, and deserted by its protectors, gradually declined under its feeble pope, and, consulting only appearances and the personal safety of its members, held its forty-fifth and last session, May 16, 1443, after an inaction of three years, interrupted only by a few insignificant decrees. At this session the place of meeting was changed to Lausanne. Here some prelates remained together under the cardinal Louis Allemand, until 1449, when, after the death of Eugenius and the resignation of Felix V., they gladly accepted the amnesty offered by the new pope, Nicholas V., and pronounced the council closed. The decrees of the Council of Basel are admitted into none of the Roman collections, and are considered of no authority by the Roman lawyers. They are regarded, however, as of authority in points of canon law, in France and Germany, as their regulations for the reformation of the church have been adopted in the pragmatic sanctions of both countries, and, as far as they regard clerical discipline, have been actually enforced. Some later concordats have modified the application of them, but never formally and entirely annulled them. (See GERMANY and FRANCE.) No general council has ever issued more just and suitable decrees for the reformation of the papal government, and of clerical discipline; none has done more to restore the authority of the bishops, which the imperious pretensions of the popes had almost annihilated, and, consequently, the ancient apostolical constitution of the church; but the canonists, who almost entirely conducted it, could not disengage themselves from the idea of the universality of the episcopal character of the pope; and, proceeding on these premises, their strongest measures for restricting his power were incomplete, and all their attempts at reformation consequently useless. If this council had accomplished its chief object—the conversion of the papal monarchy into a hierarchical aristocracy—many sources of complaint against the papal despotism would indeed have been removed; but the reformation of Luther, in the sixteenth century, would not have been prevented.

BASEL, TREATIES OF PEACE AT: April 5 and July 22, 1795. The former was signed by the Prussian ambassador, afterwards chancellor of state, Baron Hardenberg (which see); the latter by the Spanish ambassador, Marquis D. Domingo d'Yriarte; and both by the minister plenipotentiary of the French republic in Switzerland, the citizen Barthélemy. By these

treaties, Prussia and Spain separated themselves from the coalition against France, and acknowledged the republic. The republic retained the Prussian provinces on the left bank of the Rhine until the general peace, and accepted the mediation of Prussia when any German princes wished to conclude separate treaties of peace with it. A secret article was inserted in the treaty, the object of which was to secure compensation to Prussia, in case the left bank of the Rhine should remain with France at the general peace. The Landgrave of Hesse-Cassel afterwards concluded a treaty with the French republic at Basel, August 28, 1795, by which the latter retained possession of the territories of Hesse-Cassel on the left bank of the Rhine until the general peace. By the peace of Basel, all the conquests of the republican army beyond the Pyrenees were restored to Spain, in exchange for which it ceded to France the Spanish part of the island of St. Domingo. The Spanish prime minister, D. Eman. Godoy, Duke of Alcudia, received, as a reward for this treaty, the title of *Prince of Peace*.

BASHAN (meaning uncertain, perhaps *soft, rich soil*), is the name in Scripture for a singularly rich tract of country lying beyond the Jordan between Mount Hermon and the land of Gilead. These two regions, Bashan and Gilead, attracted the attention of those tribes that desired to continue the pastoral life to which they and their fathers had been accustomed; and Gilead was accordingly divided between Reuben and Gad, while Bashan was given to the half tribe of Manasseh. Modern travellers speak with enthusiasm and delight of its forests, in which oaks abound worthy to be set side by side with the cedars of Lebanon; and the 'strong bulls of Bashan' of ancient times are still represented by the vast herds of black-cattle which pasture on its fertile slopes. Bashan had been the kingdom of the Canaanite giant Og whom Moses destroyed; and one district of the country, Argob, had at that time sixty fenced cities, with walls, gates, and bars, beside unwalled towns a great many. These were standing or restored in Solomon's days; and to this day there are many points from which the traveller can see the remains of more than half that number. Among the cities of this region were Edrei, Kenath, Golan, and Bozrah. After the captivity it is mentioned as divided into Trachonitis (the ancient Argob), Gaulanitis (Golan), Auranitis (Hauran, mentioned by Ezekiel), and Batanæa, or Bashan proper.

BASHAW, Basha. See Pasha.

BASHEE ISLANDS, seven islands in the Chinese Sea, discovered by Dampier in 1687, and now belonging to Spain. The largest island is Batan, with a population of 8000. Three of them are large, and four of them inhabited. The productions are plantains, bananas, pine-apples, sugar-cane, potatoes, yams, and cotton. Their quadrupeds are goats and hogs. They are S. of Formosa. Their situation is in lon. 122° E.; lat. 20° 28′ to 20° 55′ N. Two rocks towards the north ought, according to Perouse, to be called islets, the least of them being half a league in circumference, and covered with grass. These are situated in lat. 21° 9′ N.

BASHI-BAZOUKS, irregular troops in the pay of the Turkish sultan. They are a wild, turbulent race of men, mostly from Turkey in Asia, and in the duties with which they are intrusted resemble the Cossacks in the Russian army. On the formation of the Turkish contingent during the Crimean war, in 1855, the British government enlisted a number of Bashi-Bazouks, and employed General Beatson, an Indian officer of experience, to drill them, but before they could be rendered effective, peace was concluded.

BASHKIRS, or Bashkeers, a tribe of people subject to Russia, and inhabiting the banks of the Ural and Volga. They are probably descended from the Nogay Tartars, and resemble them in their manners. They formerly roamed about, under their own princes, in Southern Siberia. To avoid the Siberian khans, they settled in their present territory, extended themselves along the Volga and the Ural, and submitted to the Khan of Khasan. At the time when this state was overthrown by Ivan II. they voluntarily took refuge under the Russian sceptre; but their frequent revolts long prevented their increase, and kept them in a weak condition. They number about 500,000, and inhabit chiefly the governments of Orenburg, Perm, and Samara. They are Mohammedans, and live by hunting, breeding of cattle and horses, and keeping of bees. They prepare from fermented mare's and camel's milk an intoxicating beverage, *kumiss*, which is their favourite drink. They are little civilized. The Bashkirs furnish the Russian army with a body of irregular cavalry, who formerly made use of the bow and arrow, but are now equipped with lances and guns.

BASIL, town of. See Basel.

BASIL, Bishop of Ancyra in 336, violently opposed the Arians, but having been convicted of entertaining semi-Arian views, was excommunicated by the Council of Sardica in 347. He still, however, retained his see, and secured a sanction of his opinions from a council held at Ancyra in 358, but was finally deposed in 360. Both St. Basil and Athanasius seem to have considered him substantially orthodox, though his modes of expression tended to mislead.

BASIL, St., called the *Great*, to distinguish him from other patriarchs of the same name, was born in 329, and made in 370 Bishop of Cæsarea in Cappadocia, where he died in 379. He is the most distinguished ecclesiastic among the Grecian patriarchs. His efforts for the regulation of clerical discipline, of the divine service, and of the standing of the clergy; the number of his sermons; the success of his mild treatment of the Arians; and above all, his endeavours for the promotion of monastic life, for which he prepared vows and rules, observed by himself and still remaining in force, prove the merits of this holy man. The Greek Church honours him as one of its most illustrious patron saints, and celebrates his festival, Jan. 1. His followers are widely extended; there are even some in America. They lead an ascetic life. The vows of obedience, chastity, and poverty framed by St. Basil are the rules of all the orders of Christendom, although he is particularly the father of the eastern, as St. Benedict is the patriarch of the western orders.

BASILICA (a royal abode, originally the hall occupied by the Archōn Basileus), amongst the ancient Athenians, the name of a kind of buildings belonging to classical antiquity, which acquired their characteristic form among the Romans. In the first centuries of Rome, the basilicæ were splendid public buildings, of an oblong shape, and four-cornered, commonly adorned with Corinthian columns and statues, where the citizens collected to consult for their common welfare, the merchants exposed their wares, the young orators exercised themselves in declamation, &c. Constantine the Great gave some basilicæ to the Christians in Rome for their worship. Thence it happened that the first Christian churches obtained the name of *basilicæ*. But in the fourth century after Christ the ancient form of the basilica began to be modified, and to receive further developments. The chief changes that from that time onwards were gradually made in its construction consisted in the raising of the nave above the rest of the building, the introduction of windows, the addi-

tion of the transepts, and the decoration of the interior with works in mosaic. At a later time towers were introduced, and still later vaulted roofs instead of the flat timber roofs with which they were formerly provided.

BASILICA, a code of laws founded on the code of Justinian, supposed to have been named after the Greek emperor Basilius I., in whose reign its compilation was begun. It was finished by Leo the Philosopher, and revised by order of his son Constantine Porphyrogenitus in 945. It consisted of 60 books, but we no longer possess them in a complete form. The principal editions are those of Fabrot (7 vols., Paris, 1647), and Heimbach (vols. i.–v. Leipsic, 1833–50).

BASILIDES, founder of one of the most remarkable sects of ancient Alexandria, lived under the reigns of Trajan, Adrian, and Antoninus, but the place of his birth, supposed to be either in Persia, Syria, or Egypt, is unknown. He was well acquainted with Christianity, but under the pretence of freeing it from corruption, corrupted it still more by mixing it up with the wildest dreams of the Gnostics, and peopling the earth and the air with multitudes of *æons*. He had numerous followers, who spread from Syria and Egypt into Italy, and even as far as France, but they suddenly sank into obscurity, and are scarcely heard of after the fourth century.

BASILISK. The basilisk of the ancients, according to Pliny (lib. viii. cap. 21), was a kind of serpent found in the African deserts, named *basiliskos*, or *little king*, because its body was marked with bright spots, and those on the head had the appearance of a crown or diadem. It had a very pointed head, with fiery eyes, and was of a dark colour, verging to blackness. All other snakes were said to fly from the sound of its hissing; and instead of trailing along like other serpents, the basilisk raised its body nearly erect, and, as it passed along, killed the herbs and fruits by its touch, and even by its breath! Yet this monster was destroyed by weasels. If these fables had reference to any real animal, it is probable that it was a species somewhat similar to the *cobra da capello*, or the asp viper. The *cobra da capello* has a mark on the back of its head, though more like a pair of spectacles than a crown: both it and the asp are accustomed to erect a very considerable part of the body, though not to move forward in this way. It is highly probable that the animal was merely a creature of fiction.

The name basilisk is now applied to a genus of saurian reptiles, of the family Iguanidæ, and distinguished from other genera belonging to it by the absence of a loose and dilatable skin under the throat, and of thigh pores, and by the presence of a remarkable crest running continuously along its back and tail. This genus includes only two species—the hooded basilisk (*Basiliscus mitratus*) and the crested basilisk (*B. Amboinensis*). The former is distinguished chiefly by the largeness of the bag or hood on its occiput, which, when filled with air, is about the size of a chicken's egg. Its whole length is about 26 inches, but of these only 7 or 8 are occupied by the head and back, and all the rest by a long compressed tail. The crested basilisk receives its name of *Amboinensis* from its abundance in the island of Amboyna, and indeed generally in the Indian Archipelago. It is above 3 feet long, of a green colour, with stripes, which on the head and neck are white, on the back and tail brown, and on the belly of whitish silvery hue. It frequents the sides of rivers and fresh-water ponds, often basking among the trees which overhang them, and dropping suddenly down into the water on any appearance of danger. Being both stupid and timid it is easily caught. Its flesh is wholesome, white and tender as a chicken, and tastes like venison.

BASILIUS I., a Macedonian who, though born of poor parents about the beginning of the ninth century, ultimately rose to be Emperor of Constantinople. Having arrived in that city for the first time, in his twenty-fifth year, he gained the favour of an archimandrite, who procured him service with an officer of the court of the emperor Michael III. His good fortune still attended him, and from the service of the officer he passed to that of his imperial master, and was appointed head-chamberlain. A patrician named Bardus, who was related to Michael, having become jealous of the influence of Basilius, was plotting his downfal, but Basilius anticipated him, and charged Bardus with conspiracy. Bardus cleared himself; but Basilius continued to advance so rapidly in the emperor's favour, that he shortly after was adopted as his colleague. The Macedonian's ambition was not yet satisfied, and knowing that Michael had rendered himself odious by his cruelty and debauchery, he headed a body of conspirators, and murdered him in his bed in 867. Basilius had worked his way to the throne by a series of crimes, but proved an able and equitable sovereign; paid equal attention to the internal administration and the foreign relations of the empire, and not overlooking even its religious interests, sent an archbishop into Russia, and laid the foundation of that ascendency which the Greek Church has so long possessed in that country. The versatility, if not the depth of his intellect, is strikingly displayed in his Exhortations to his Son Leo, which are still extant. His death, in 886, was caused by a blow given him by a stag while he was hunting.

BASILIUS II., on the death of his father, the emperor Romanus the Younger, in 963, was kept out of the succession for twelve years by two usurpers, the first, Nicephorus II. (Phocus), who died in 969, and the second, Johannes (John) Zimisces, who associated Basilius and his brother Constantine with him in the empire in 975, and died the following year, leaving the whole power to Basilius, although Constantine was still his colleague in name. His reign was almost a continued scene of warfare, in which the contending parties seemed to vie with each other in committing deeds of cruelty, but was extended for the unusual period of fifty years. He died in 1025.

BASIN, a term of comparatively recent use in physical geography, is generally used in relation to rivers, lakes, and seas, and designates not only the ground actually covered by them, but the whole area of the countries which send their drainage to them. Thus, for example, the basin of the Baltic means not merely the expanse of water to which that name is given, but all those parts of Germany, Russia, Sweden, and Denmark drained by rivers and lakes which discharge themselves into the Baltic. The boundary between two basins, formed for the most part by a ridge or plateau interposed between them, and sending the waters which descend from its sides in opposite directions, is called the watershed. In geology the term basin is sometimes employed to designate, not an area of drainage, but an area occupied by a particular formation. Thus we speak of the Paris basin and the London basin. In a still more restricted sense, a coal-field is sometimes designated a coal-basin, because in many cases the area over which coal-seams extend has more or less of the shape of a basin.

BASINGSTOKE, a town and parish of England, in the county of Hants. The town, pleasantly situated near the source of the Loddon, 18 miles

N.N.E. from Winchester, consists of several streets lined with well-built houses, paved, amply supplied with water, and lighted. A handsome new town-hall was erected here in 1832, containing a spacious market for corn, a ball-room, and other apartments for public purposes. Basingstoke has a church, a fine Gothic structure erected in the time of Henry VIII., several other places of worship; a mechanics' institute, with good library; and numerous charities founded by private persons. A considerable trade is carried on in corn and malt. Population of municipal borough in 1871, 5574.

BASKERVILLE, JOHN, an English artist, deserving of notice for his improvements in printing and type-founding. He was born at Wolverley, in Worcestershire, in 1706, and, inheriting a small estate, was brought up to no profession. He, however, acquired a particular skill in penmanship and carving letters on stone; and at the age of twenty he settled at Birmingham as a writing-master. He subsequently engaged in the manufacture of japanned works; and in 1750 commenced his labours in the branch of art which acquired for him so much celebrity. His first great performance as a printer, was an edition of Virgil, in royal 4to, 1756, which was followed by many of the Latin classics, and some English ones, in 4to and smaller sizes. The beauty of his typographical productions was superior to anything which had previously appeared from an English press; and when it is considered that the paper and ink, as well as the types and workmanship, were the fruits of one man's skill and ingenuity, it must be admitted that he possessed great merit. He died in 1775, and his types and matrices were afterwards sold at Paris for £3700, to Beaumarchais, who printed with them at Kehl a superb edition of Voltaire.

BASNAGE, a family of French Protestants, remarkable for the number of able men and eminent writers whom it has produced.—1. NICOLAS, who having espoused the doctrines of the Reformation, was compelled by persecution to take refuge in England, where he became the minister of a congregation at Norwich. When, by the accession of Henry IV., a better era began to dawn he returned to his country, and officiated till his death as the minister of a church at Carentan.——2. BENJAMIN, son of the former, born in 1580, succeeded his father in his charge, and held it for the long period of fifty-one years. He long held a prominent place among the reformers of France, presided in the assembly held at Rochelle in 1622, undertook the dangerous task of negotiating for English aid, travelled into Scotland to arouse the Protestant feeling in that country, and on his return took the lead in the important synods held at Charenton in 1623 and 1631, and at Alençon in 1637. His principal work, entitled Traité de l'Eglise, is a good specimen of his talents. He died in 1652.——3. HENRI DE FRANQUENAY, born in 1615, died in 1695, youngest son of Benjamin, studied for the bar, and as a provincial advocate in Rouen long stood at the head of his profession. His eloquence, learning, and unsullied integrity secured him the esteem, not only of the Protestants, whose views he held, but even of those most violently opposed to them. His complete works, confined to juridical subjects, were published at Rouen, in 2 vols. folio, in 1778.——4. JACQUES, eldest son of Henri, born at Rouen in 1653, is the best known, and perhaps the ablest member of the family. At Saumur he became the favourite pupil of Tanaquil le Fèvre, who would fain have dissuaded him from studying for the church; but his resolution, previously avowed, was not to be shaken, and he completed his course of theology by studying, first at Geneva and afterwards at Sedan. On his return, in 1676, he became minister of the Protestant church at Rouen. In 1685, the bigotry of Louis XIV. having closed his church, he removed to Holland, and officiated as minister, first, for a short period, at Rotterdam, and then permanently at the Hague. Although he had been tyrannically driven from his home, so high was the opinion entertained both of his ability and integrity, that when the French government were anxious to form a coalition with England and the United Provinces, one of the leading instructions given to their ambassador was to take the advice of Basnage, and be guided by it. On this and on other occasions Basnage showed that had worldly aggrandizement been his object, he could easily, as a statesman, have outstripped his fame as a divine. He died in 1723. His works are very numerous, and some of them having been called forth by the circumstances of the times have lost much of the interest which originally attached to them; but several of them are still standards on the subjects of which they treat. Among others may be mentioned Histoire de l'Eglise, 2 vols. folio; Histoire des Juifs, 15 vols. 12mo; Annales des Provinces Unies, 2 vols. folio; and La Communion Sante, 12mo.

BASQUES, or BISCAYANS; in their own language, *Euscaldunac;* a remarkable race of people dwelling in the south-west corner of France, and in the north of Spain, on both sides of the Pyrenees. They are probably descendents of the ancient Iberi, who occupied Spain before the Celts. The French Basques (Gascons) settled, at the end of the sixth century, on the north side of the Pyrenees, between those mountains and the Garonne. After long struggles they submitted to the kings of the Franks. Under the Carlovingian race they elected their own dukes, but, after the extinction of that family, they fell under the dominion of Aquitania in the eleventh century, and with it under that of France in 1453. The Basques preserve their ancient language, former manners, and their national dances, and make admirable soldiers, especially in guerilla warfare, to which their native temperament inclines, and their frequent expeditions in carrying on the smuggling, to which they are much addicted, inure them. They are very good seamen, and were the first Europeans who engaged in the whale-fishery, which they have, however, long since relinquished. They occupy, in Spain, the provinces of Biscay, Guipuzcoa, and Alava; in France, the departments of the Upper and Lower Pyrenees, Ariége, and Upper Garonne. See BISCAY.

BASS (from the Italian *basso*, deep, low), the lowest part in the harmony of a musical composition. It is the most important of all the parts, the foundation of the harmony, and the support of the whole composition.—*Figured bass* is a bass which, while a certain chord or harmony is continued by the parts above, moves in notes of the same harmony. For example, if the upper parts consist of C, E, G (the common chord or harmony of C), and, while they are continued, the bass moves from C, the fundamental note of that harmony, to E, another note of the same harmony, that bass is called a *figured* bass.—*Fundamental bass* is that bass which forms the tone or natural foundation of the harmony, and from which that harmony is derived. To explain this by an example: if the harmony consist of the common chord of C, C will be its fundamental bass, because from that note the harmony is deduced; and if, while that harmony is continued, the bass be changed to any other note, it ceases to be fundamental, because it is no longer the note from which that harmony results, and is calculated.—*Ground-bass* is a bass which starts with some subject of its own, and continues to be repeated throughout the movement, while the upper part or parts pursue a separate air, and supply the harmony. This kind of bass was

greatly in fashion half a century ago, but has long since been rejected as an unnatural restraint upon the imagination, and productive of a monotonous melody.—*Thorough-bass.* (See THOROUGH-BASS.)—*Bass clef* is the character put at the beginning of the stave, in which the bass, or lower notes of the composition, are placed, and serving to determine the pitch and names of those notes.—*Basso concertante* (Ital.) is the bass of the little chorus; the bass which accompanies the softer parts of a composition, as well as those which employ the whole power of the band. This part is generally taken by the violoncellos.—*Bass-counter* or *contra-bass*, the under bass; that part which, when there are two basses in a composition, is performed by the double basses, the violoncellos taking the upper bass or *basso concertante.*—*Basso recitante* (Ital.), the bass of the little chorus. (See above.)—*Basso repieno* (Ital.), the bass of the grand chorus; that bass which joins in the full parts of a composition, and, by its depth of tone and energy of stroke, affords a powerful contrast to the lighter and softer passages or movements.

BASS, THE, a remarkable insular trap-rock at the mouth of the Firth of Forth, 3 miles from North Berwick. It is of a circular form, about 1 mile in circumference, rising majestically out of the sea to a height of 420 feet. On being closely approached its aspect is tremendous, from its lofty precipitous walls of rock, and the immense excavations which the sea has opened all around, one of which, running north-west and south-east, may be taken in calm weather. The rock is inaccessible except on one flat shelving point to the south-east. There is a spring of water on its summit, the superficies of which has been guessed at 7 acres, and on which a few sheep are grazed, which bring a high price, Bass mutton being considered a great delicacy. Solan geese and other sea-fowl in myriads cover its rocks, and keep flying around it in clouds. On the north-east side the water is of great depth, but shallow on the south. Among the several ruins on the island of historical interest are the remains of a fortalice, commanding the landing-place, capable of accommodating upwards of 100 men, and which had been accessible only by ladders or buckets and chains; and the ruins of a chapel about halfway up the acclivity of the rock. The Bass was purchased by the English government in 1671, and its castle, long since demolished, converted into a state prison, in which several eminent Covenanters were confined. It was the last place in Britain that held out against William III., its gallant defenders, a small band, yielding only when they had no longer means of subsistence. This singular rock anciently belonged to a family of the name of Lauder, the head of which was styled Lauder of the Bass.

BASSA, a country on the west coast of Africa, about 400 miles south of Sierra Leone. It came into notice by a grant of land which the American Colonization Society succeeded in obtaining there from the king. The Bassas are described as without civilization, like so many other negro tribes of the west coast of that part of the world. See LIBERIA.

BASSANO (whose real name was GIACOMO DA PONTE), a painter, born in 1510. He was surnamed *Bassano* from the place, Bassano, where his father lived. His pictures are scattered all over Europe. He painted historical pieces, landscapes, flowers, &c., and also portraits; among others, that of the Doge of Venice, of Ariosto, Tasso, and other persons of eminence. He lived to the age of eighty-two, dying in 1592. Several of his best works are in the churches of Bassano, Venice, Vicenza, and other towns of Italy. He left four sons, who all became painters. Francesco was the most distinguished of them.

BASSANO, a commercial city in the kingdom of Italy, province of Vicenza, on the Brenta (lon. 11° 43′ E.; lat. 45° 46′ N.), has spacious suburbs, and 11,857 inhabitants. Its thirty churches contain beautiful paintings. A stone bridge, 182 ft. long, unites the town with the large village Vicantino. The climate is very favourable to the cultivation of the vine and olive. The trade in silk, cloth, and leather is active, and it has considerable manufactures of straw-hats, porcelain, and wax. Napoleon made Bassano a duchy, with 50,000 francs yearly income, and granted it in 1809 to his minister of foreign affairs, Maret. Near Bassano, September 8, 1796, Bonaparte defeated the Austrian general Wurmser. Bassano was the birth-place of the famous printer Mauritius, as well as the historical painter Giacomo da Ponte (Bassano), and a short distance from Bassano lies the village of Possagus, the birth-place of Canova.

BASSEIN, a town in the British province of Pegu, which formerly belonged to the Burmese Empire, on the left bank of the Bassein river, one of the mouths of the Irrawaddy; lat. 16° 45′ N.; lon. 94° 50′ E. The river is navigable up to the town for ships of the largest burden. Bassein is an important place in a strategical point of view, from the command which it possesses of the navigation of the river. It was captured by the British in 1852. Pop. 20,000.

BASSEIN, a seaport town in Hindostan, in the presidency of Bombay, in the province of Aurungabad; lat. 19° 22′ N.; lon. 72° 54′ E.; 30 miles north from Bombay, and separated from the island of Salsette by a narrow channel. It was fortified by the Portuguese in 1531, and remained in their possession until captured by the Mahrattas in 1750. Here the treaty was signed, December 31, 1802, between the peishwa and the British government, which annihilated the federal empire of the Mahrattas; since which it has belonged to the British. A considerable part of the rural population of the district are Roman Catholics. To the north and north-east of the town are extensive forests of teak, from which the dockyards of Bombay are supplied.

BASSET, the name of a game at cards, formerly much played, especially in France. It is very similar to the modern *faro.* Severe edicts were issued against it by Louis XIV., and it was afterwards played under the name of *pour et contre.* De Moivre, in his Doctrine of Chances, has calculated many problems connected with this game.

BASSETERRE, two towns in the West Indies:—1. Capital of the island of St. Christopher's; is situated at the mouth of a small river, on the south side of the island; contains about 800 houses, a spacious square, and a church, and is defended by three forts. The district of Basseterre contains 17 square miles, with a population of 6620, and is divided into two parishes—St. George's and St. Peter's, the former of which sends four, the latter two members to the assembly. The vale of Basseterre is beautiful, and well cultivated.——2. The capital of the island of Guadaloupe, lies near the south end of the island, and consists of one principal long street, stretching along the sea-shore. It is defended by Forts Royal and Matilda. The anchorage is unsheltered and exposed to a constant swell. Pop. 9480, exclusive of military.

BASSET-HORN, the richest of all wind-instruments (called also *cornet*, by reason of its curvature), is believed to have been invented in Passau, in 1770. It was afterwards perfected by Theodore Lotz, in Presburg. It is, properly considered, an enlarged clarionet; and, notwithstanding the difference of its form, it resembles that, not only in its qualities and tone, but also as regards its intonation, the mode of holding it, and fingering; so that every clarionet-

player can perform on it without practice. Besides the mouth-piece, by which the intonation is given, it is formed of five pieces—the head-piece (called the *barrel*), two middle pieces, the trunk and the bell, which is usually of brass. It has fifteen ventages, of which four are provided with open, four with closed keys. Its compass is three and a half octaves, from lower F in the bass, to double C of the treble. It is seldom used in the orchestra; however, it is found in Mozart's Requiem and some other pieces. The basset-horn may also be used as a bass instrument.

BASSOMPIERRE, FRANÇOIS DE, Marshal of France, one of the most distinguished and most amiable men of the courts of Henry IV. and Louis XIII., was born in 1579, in Lorraine, and descended from a branch of the house of Clèves. After travelling through Italy, he appeared at the court of Henry IV., where his taste for splendour, play, and gallantry made him conspicuous in the feasts and sports of the capital. In 1602 he made his first campaign against the Duke of Savoy, and fought with equal distinction in the following year, in the imperial army, against the Turks. His love of France soon called him back; he aspired to the hand of the daughter of the Constable De Montmorency, whose charms had excited the most violent passion in Henry IV. Bassompierre yielded to the solicitations of his king, and renounced his intended union with her. In 1622 Louis XIII. appointed him Marshal of France, and became so much attached to him, that Luynes, the declared favourite, alarmed at his growing influence, insisted upon his removal from the court, leaving him the option to accept either an embassy, or the chief command of an army, or the office of a governor. Bassompierre decided upon an embassy, and occupied this post successively in Spain, Switzerland, and England. After his return, he entered again into the military service, and was present at the siege of Rochelle and Montauban. The Cardinal Richelieu, who soon after obtained entire control of the king and the country, feared the boldness of Bassompierre and his secret connection with the house of Lorraine; whose machinations served him as a pretext for sending Bassompierre, in 1631, to the Bastille, from which he was not released till 1643, after the death of the cardinal. He died in 1646. Bassompierre studied, in his youth, philosophy, jurisprudence, medicine, and the military art. During his detention, he occupied himself with his memoirs, and the history of his embassies in Spain, Switzerland and England, which sheds much light on the events of that time.

BASSOON (Fr. *bas son*, low sound), an instrument which forms the natural bass to the hautboy. It is played, like that instrument, with a reed, and forms a continuation of its scale downwards. The reed is fixed to a crooked mouth-piece, issuing from the side of the bassoon. There, keys communicate to the ventages, which otherwise are too remote for fingering. It was formerly used as an accompaniment to the hautboy, from which it was termed *basson de hautbois*. But it is now so far improved with keys as to be susceptible of being played solo. Its compass is three octaves, from double A in the bass to A in the second space of the treble; and its designation generally is the F or bass clef; yet, in the higher passages, for the more convenient arrangement of the notes, the alto, or tenor clef, is often used. It consists of four tubes, bound together like a fagot. Hence the Italians term it *fagotto*, and from them the Germans *fagott*. In music designed for wind-instruments it usually forms the bass. There is a modification of this instrument, much lower and stronger in its tones,—the bass horn,—which, in field music, has of late been substituted for the serpent.

BASSORA, or BASRAH, a city in Asiatic Turkey, situated between two and three miles on the W. side of, and on a navigable canal leading from the Shat-el-Arab, as the united stream of the Tigris and Euphrates is called, about half-way between the Persian Gulf and the junction of the two rivers; population in the middle of last century, 150,000; in 1824, 60,000; at present only about 20,000. The Shat-el-Arab is navigable for vessels of 500 tons to Bassora, 70 miles. Merchants from Arabia, Turkey, Armenia, and Greece, also Jews and Indians, reside here. The Arabs are more numerous than the Turks, and the language of the former is chiefly spoken. The city is surrounded by a wall about ten miles in circuit, from twenty to twenty-five feet thick. The houses are generally mean, being constructed of clay, with a small proportion of bricks, and the bazaars are but miserable edifices. A considerable trade is carried on in the shipment and trans-shipment of merchandise between Turkish Arabia and India, but a great part of the trade is now drawn to Mohamera, a town lying lower down on the Persian side of the Shat-el-Arab. Mail steamers run once a fortnight between Bombay and Bassora, and there are also steamers running up the river to Bagdad. Dates and date-juice form the principal export; camels and horses, wool and wheat, coming next. The exports in 1870 were £187,165; the imports, £113,625. The trade of the interior is conducted by means of caravans to Aleppo and Bagdad. The town is dirty and unhealthy; the environs are very fertile. The modern Bassora arose only in the seventeenth century, and does not occupy the site of the older and more famous Bassora, the ruins of which lie about nine miles south-west of it.

BASSO-RILIEVO. See BASS-RELIEF.

BASS-RELIEF (in Italian, *basso-rilievo*), as applied to sculpture, signifies a representation of one or more figures, raised upon a flat surface or background; in such a manner, however, as that no part of them shall be entirely detached from it.—*Alto-rilievo*, or high relief, is that in which the figures project half of their apparent circumference from the back-ground.—*Mezzo-rilievo*, or middle relief, is the third species, between the two. But, generally speaking, the first term is made to comprehend both the others. The term itself was invented in Italy about the eleventh or twelfth century, on the revival of the arts; for the Greeks called such works simply carved (*anaglypta*); and to what is now called *high relief*, they only applied the term rounded (*torcutikē*).

Bass-relief is particularly allied to architecture, and under its dominion, as any considerable work of this kind must be made for the pediment, frieze, or panel of a building, or for some other portion of architecture, such as a tomb, sarcophagus, pedestal, or column. Bass-reliefs seem to have been invented in the earliest ages by the Egyptians, for the whole of their ancient monuments are covered with them, being identically the same as the hieroglyphics on their sepulchral chambers, and obelisks, and temples. This has been finely illustrated by the drawings and models of the Egyptian tomb discovered near the ancient Thebes, by Belzoni, and which has become familiar to thousands in this country; all the walls of that extraordinary excavation being covered with thousands of figures in low relief, coloured, and exhibiting the religious and warlike ceremonies of that wonderful people. Bass-reliefs, too, are found in India, decorating the subterraneous temples of Ellora and Elephanta in an astonishing profusion. The subjects are, of course, sacred, and in the style of drawing resemble very strongly those of the Egyptian monuments, but are evidently inferior,

having larger heads and disproportioned bodies and limbs. Both these temples have been well illustrated and described by Mr. Thomas Daniell, R.A., and Captain Scaley; and for further information, their respective works may be consulted. The Persians, too, like other ancient nations, employed bass-relief as a figured writing, thereby recording and representing the symbols of the power and energy of the Divinity, their own religious ceremonies, and warlike achievements. The sculptures still existing on the ruins of the palace of Persepolis and the royal tombs accord in many striking particulars with those brought to this country by Belzoni. In both the figures are arranged in lines, either horizontal or perpendicular, to suit the double purpose of decoration and description. In both of them the natives of Egypt are distinguished by the hood with lappets, the mitre, the full hair artificially curled, the close tunic, the apron of papyrus; the Hindoos, by the necklaces, bracelets, and anklets; the Hebrews, by their long beards, and hair in spiral ringlets, their caps, full tunics, with regular folds and large sleeves. The Medes, again, by their close tunics; while the Persians themselves, in many particulars, resemble the Hebrews. The comparison may be easily made by looking over the prints in Sir Robert Ker Porter's Travels in Persia, and those in Le Bruyn's Travels, and then the engravings of Denon's and Belzoni's large works.

Since it has been well observed, that the Greeks commenced in works of art precisely where the Egyptians left off, we find that the early bass-reliefs of Greece resemble pretty accurately those of Egypt. The objects are represented in the same hard and simple manner, and the marbles brought to this country from the temple of Ægina serve to fill up the history of sculpture, in the interval between its first introduction into Greece and its full development under Phidias, at Athens, when that glorious work, the Parthenon, was produced under the auspices of Pericles.

The draperies in these early bass-reliefs are thin and meagre, showing the forms of the body and limbs, the folds regular, small, and distinct, consisting chiefly of perpendicular and zigzag lines. Some of the head-dresses consist of small curls, very like the fashions of barbarous nations; and in a bronze patera in the British Museum, the club of Hercules is ornamented with spiral flutes, like one brought by Captain Cook from the Sandwich Islands.

The best examples of bass-relief now in existence are to be found within the walls of the British Museum. We mean, of course, those of the Elgin Marbles, which are executed in this manner. And in the same collection are the tombstone of Xanthippus, and a man curbing a horse, both conjectured to be of the age of Phidias, and which formed part of the Townley collection. In the collection of the Marquis of Lansdowne is a Greek bass-relief of Calchas, the size of life. At Wilton there is a beautiful representation of the Death of Meleager, and a small but curious Hercules and Æglé; a bass-relief composed of mosaic in natural colours, which is supposed to be unique. The celebrated Barberini vase, formerly in the possession of the Duke of Portland, is of dark blue glass, bearing figures in bass-relief of white enamel or glass of admirable workmanship. Fragments of bass-reliefs of similar materials have been found in the ruins of Cæsar's palace, at Rome, where they had been fixed in the walls. The two triumphal columns of Trajan and Antonine are covered with bass-reliefs, containing several thousand figures (the first, indeed, has 2500 human figures, according to Vasi), without reckoning horses, elephants, mules, and the implements of war.

Marble sarcophagi do not appear to have been much used in Rome before the time of Crassus, whose wife, Cecilia Metella, was buried in one. The fronts and ends of these coffins, from that time for many ages afterwards, were decorated with figures, and some of the finest compositions of the ancient sculptors are to be found upon them, most probably copied from the Greek originals by Roman statuaries. The sublimity of the subjects has led to the supposition that some have derived their origin from Phidias, Polycletus, and others of the greatest masters, as it is scarcely possible such groups and such expressions as we see in these bad copies could have been first imagined by such inferior artists. Among them are the stories of Prometheus, Medea, Phaeton, Orestes, Alceste, the Anger of Achilles, Bacchus and Ariadne, the Fall of the Giants, and the Judgment of Paris, &c. Among the famous modern bass-reliefs are those of Bandurli, Ghiberti, and Lucca della Robbia, at Florence. Some of the finest bass-reliefs existing are by Canova, Flaxman, and Thorwaldsen.

BASS'S STRAITS, a channel beset with islands, which separates Australia from Tasmania; 120 miles broad; lon. 147° 30′ E.; lat. 40° S.

BASS VIOL, a stringed instrument, resembling, in form, the violin, but much larger. It has four strings and eight stops, which are subdivided into semi-stops, and is played with a bow.

BASTARD. The Romans distinguished two kinds of natural children—*nothi*, the issue of concubinage, and *spurii*, the children of prostitutes; the former could inherit from the mother, and were entitled to support from the father; the latter had no claims whatever to support. *Is non habet patrem, cui pater est populus.* The Athenians treated all bastards with extreme rigour. By the laws of Solon, they were denied the rights of citizenship. A law of Pericles ordered the sale of 5000 bastards as slaves. What rendered these regulations more severe was, that not only the issue of concubinage and adultery, but all children whose parents were not both Athenians, were considered bastards at Athens. Thus Themistocles, whose mother was a native of Halicarnassus, was deemed a bastard. The law, as might be expected, was often set aside by the influence of powerful citizens. Pericles himself had it repealed in favour of his son by Aspasia, after he had lost his legitimate children by the plague. The condition of bastards has been different in different periods of modern history. Among the Goths and Franks, they were permitted to inherit from the father. Thiery, the natural son of Clovis, inherited a share of his father's conquests. William the Conqueror, natural son of Robert I., duke of Normandy, and of Arlette, daughter of a furrier of Falaise, inherited his father's dominions. He called himself *Willelmus, cognomento Batardus.* The celebrated Dunois styled himself, in his letters, the *Bastard of Orleans.* In Spain, bastards have always been capable of inheriting. The bastardy of Henry of Transtamare did not prevent his accession to the throne of Castile. In France, the condition of bastards was formerly very different in the different provinces. Since the revolution, it has been regulated in a uniform manner by the general law of the kingdom. The *code civil* thus fixes their rights: If the father or mother leave legitimate descendants, the bastard is entitled to one-third of the portion he would have inherited had he been a lawful child; if the father or mother die without descendants, but leave ascendants, or brothers or sisters, then he is entitled to one-half of such a portion; if the father or mother leave no ascendants nor descendants, nor brothers nor sisters, he is entitled to three-quarters of such a portion; and if the father or mother leave no relations within the degrees of suc-

cession, he is entitled to the whole property. These regulations do not apply to the issue of an incestuous or adulterous connection. The law allows no civil privileges to individuals who owe their existence to the violation of human and divine laws; it grants them only support. According to the ancient customs, the bastards of kings, acknowledged by their fathers, were princes; those of princes were gentlemen. Several distinguished men have been bastards, among whom, besides those given above, may be mentioned —the Duke of Vendôme, the Duke of Berwick, the Marshall Saxe.

By the common law of England, a child born after marriage, however soon, is legitimate, or at least he is presumed to be so; for one born in wedlock, and long enough after the marriage to admit of the period of gestation, may still be proved illegitimate, in case of absence and non-access of the husband, and under some other circumstances. According to the common law, a bastard is not the heir of any one; and, on the other hand, his only heirs are his children born in wedlock, and their descendants. According to the Roman law, one born out of wedlock might be legitimated by subsequent marriage and acknowledgment of his parents. In 1236 the English prelates proposed the introduction of the Roman law, in this respect, into England, to which the nobility made the celebrated reply, *Nolumus leges Angliæ mutare* (We are unwilling to change the laws of England). The Roman law has been long adopted in Scottish law.

BASTARD BAR, the ordinary name given to the heraldic mark used to indicate illegitimate descent. Properly speaking, however, it is not a bar at all, which is a mark stretching horizontally across the shield, but a peculiar mark which stretches diagonally across the shield in the direction of the sinister chief and the dexter base, but couped, that is, cut short at the ends, so as not to touch the corners of the shield. This circumstance serves to distinguish the bastard bar from the bend sinister, as well as the fact that the former is only one-fourth of the breadth of the latter. This mark in heraldry is of comparatively recent origin, bastards in earlier times not having been allowed to bear the arms of their fathers. A bastard bar could not be removed without the consent of the head of the family or the sovereign. Sometimes permission was granted to a bastard or one of his descendants to bear it dexter instead of sinister, although he was not allowed to cancel it altogether.

BASTIA, the former capital of the island of Corsica (lon. 9° 26′ 30″ E.: lat. 42° 41′ 36″ N.), upon a hill in the N.E. part of the island, in the shape of an amphitheatre. It is badly built, has narrow streets, a strong citadel near the sea, and a spacious, but not very commodious harbour. The inhabitants (21,535) carry on a considerable trade in hides, wine, oil, figs, and pulse. The stilettoes manufactured here are held in great esteem by the Italians. In 1745 Bastia was taken by the British, but restored in the following year to the Genoese. In 1748 it was unsuccessfully besieged by the Austrians and Piedmontese; in 1768 it was united with France. It afterwards fell, for a short time, into the power of the British. On the new division of the French territories (1791), Bastia was made the capital of the department of Corsica, of which, at present, Ajaccio is the capital.

BASTILLE properly means any strong castle provided with towers, but as a proper name is applied to a famous castle which once existed in Paris, in which state prisoners and other persons arrested by *lettres-de-cachet* were confined. It was founded by Hugues d'Aubriot in 1369, and completed by the addition of four towers in 1383. The *lettres-de-cachet* mentioned above were issued in the name of the king, but the names of the individuals were inserted by the ministers, who were the depositaries of these lettres. Of the origin of this custom we may perhaps find the explanation in Montesquieu's Esprit des Loix, where it is said, 'Honour is the virtue of monarchies, and often supplies its place.' A nobleman was unwilling to be dishonoured by a member of his family. Filial disobedience and unworthy conduct were not uncommon among the overrefined nobility of France. In such cases fathers and relations often requested the confinement of the offender, until the head of the family should express a wish for his release. At first this privilege was limited to the first families of the country. The next step was, that the ministers of government considered themselves entitled to the same privileges as heads of families among the nobility. If an offence was committed in their offices or households, which, if known, would have cast a shadow upon the ministers themselves, they arrested, *motu proprio*, the obnoxious individuals, and often made use of their privilege to put out of sight persons whose honest discharge of duty had excited their displeasure, or who were acquainted with facts disgraceful to the ministers themselves. It sometimes happened that no further examination of the prisoners was had, and the cause of their detention nowhere recorded. In such cases an individual remained in prison sometimes thirty or forty years, or even till his death, because succeeding officers took it for granted that he had been properly confined, or that his imprisonment was required for reasons of state. The invention of the *lettres-de-cachet* immediately opened the door to the tyranny of ministers and the intrigues of favourites, who supplied themselves with these orders, in order to confine individuals who had become obnoxious to them. These arrests became continually more arbitrary (see CACHET, LETTRES DE), and men of the greatest merit were liable to be thrown into prison, whenever they happened to displease a minister, a favourite, or a mistress. On the 14th of July, 1789, the Bastille was surrounded by a tumultuous mob, who first attempted to negotiate with the governor Delaunay, but when these negotiations failed, began to attack the fortress. For several hours the mob continued their siege without being able to effect anything more than an entrance into the outer court of the Bastille; but at last the arrival of some of the Royal Guard with a few pieces of artillery forced the governor to let down the second drawbridge and admit the populace. The governor was seized, but on the way to the hôtel de ville he was torn from his captors and put to death. The next day the destruction of the Bastille commenced. A bronze column has been erected on its site.

BASTINADO, or BASTONADO, a punishment used among the Turks, which consists of blows upon the back or soles of the feet, applied with a light wooden stick, or with a knotted string.

BASTION (bulwark). In order to defend a place which is surrounded by a rampart and a ditch, it is necessary that every point at the foot of the rampart, in the ditch and before the citadel, should be, as much as possible, commanded by the cannon of the works. This is effected by breaking the line of fortification, so that a defence sideways may be attained. Before, and for some time after the invention of gunpowder, it was thought that towers, standing out from the wall, would answer this purpose; but these soon gave place to the spacious and projecting bastions or bulwarks, which consist of two flanks, that serve principally for the defence of the

neighbouring bastions, and of two faces, which command the outworks and the ground before them. The wall between two bastions is called the *curtain*. These bastions are built in very different ways. Some are entirely filled with earth; some have a void space inside; some are straight, some curved, some double, some have even three or four flanks, one over the other; some have, and some have not *fausse-brays* (see FORTRESS); sometimes they have casemates, destined for the retreat of the garrison, or for batteries; sometimes cavaliers (which see) or orillons (which see), &c. In modern times, among the fortifications built according to the system of bastions, those on the plan of Cormontaigne and the modern French works, are considered best adapted for defence. They are spacious; the flank of the side bulwark, which is perpendicular to the prolongation of the face of the principal bulwark, is not farther distant than 300 paces from its point; it is also straight, and orillons and other artificial contrivances are banished.

BASTON, ROBERT, a poet born in the fourteenth century, near Nottingham, became prior of a Carmelite convent at Scarborough, and is said to have accompanied Edward I. into Scotland, with the view of celebrating the anticipated victories of his sovereign, but having been taken prisoner, was compelled to change his strain, and wrote in honour of Robert Bruce. He died about 1310, and, besides poetry, left several works in Latin, one entitled De Variis Mundi Statibus, and another, De Sacerdotum Luxuriis.

BASTWICK, JOHN, a physician, born at Writtle in Essex in 1593, studied first at Cambridge, and afterwards at Padua, where he took his degree. He settled at Colchester, but instead of confining himself to his profession, entered keenly into theological controversy, and in 1624 procured the publication in Holland of a treatise which he had written, entitled Elenchus Religionis Papisticæ, in which, as he declares on the title-page, he proves it to be neither apostolical nor catholic, nay, not even Roman. He afterwards published in London another work with the title Flagellum Pontificis et Episcoporum Latialium, which acquired some notoriety as a fervid attack on Episcopacy in general, and attracted the attention of the High-commission Court, who called the author before them, and condemned him to a fine and two years' imprisonment. The sentence produced the result not uncommon in cases of persecution, and Bastwick became more zealous than before, published a defence, addressed to the English prelates, and the new litany, in which his former offences were boldly repeated. A second sentence mercilessly condemned him to a much heavier fine, to exposure on the pillory, the loss of his ears, and imprisonment for life. The last part of the sentence was carried into effect by removing him first to Launceston Castle in Cornwall, and then to the castle of St. Mary, one of the Scilly Isles. The ascendency of the Parliament in 1640 procured his freedom; the sentence was formally repealed, and Bastwick, with Prynne and Burton, who had been condemned at the same time, made a triumphant entry into London amid the acclamations of the people. His subsequent life and the date of his death are unknown. He appears to have been a stanch Presbyterian, for in 1648 we find him engaged in keen controversy with the Independents.

BASUTO LAND, a district of South Africa, lying to the east of the Orange River Republic, and on the north-east of Cape Colony, with which it is now incorporated. The Basutos belong chiefly to the great stem of the Bechuanas, out of one of the chief branches of whom, along with the survivors of various other Caffre tribes, they were formed. Their countenance is better formed than that of the negroes, although they have the flat nose, protruding lips, and woolly hair of the latter. Their figure is slender and well proportioned, the colour of their skin a very dark brown, and their disposition cheerful, mild, and pacific. Their land, called by themselves Lesuto, is very fertile, and is cultivated by them with great industry; but its fertility has long exposed them to the invasions of neighbouring Caffre tribes, as well as to the encroachments of the Dutch boers and the English colonists. Under their late chief Moshesh, who died in 1869, they were raised from a state of utter barbarism to a certain degree of civilization. They were induced to give up cannibalism, and the land was thrown open to missionaries. In spite of this, however, they continued to sink into a more and more wretched condition, owing to the constant attacks of their warlike neighbours, so that their chief Moshesh was at last induced to request the British government to adopt them as subjects. The request was acceded to, and by the proclamation of March 12, 1868, Basuto Land was declared British territory.

BAT, an order of mammiferous quadrupeds, characterized by having the tegumentary membrane extended over the bones of the extremities in such a manner as to constitute wings capable of sustaining and conveying them through the air. The name of *cheiroptera*, or hand-winged, has therefore been bestowed on this order. It comprises a great number of genera, species, and varieties; among which are to be found some most singular modifications of structure, in the form of the wing membranes, the figure and expanse of the ears, and the remarkable membranous appendages to the noses of various species. All the bats are either purely insectivorous, or insecti-frugivorous, having exceedingly sharp cutting and acutely tuberculated jaw-teeth, and the whole race is nocturnal. They vary in size from that of the smallest common mouse up to that of the gigantic Ternate bat, whose body is as large as that of a squirrel. The smaller species are abundantly distributed over the globe; the larger seem to be confined to warm and hot regions, where they exist in great numbers, and are very destructive to the fruits. The purely insectivorous species render great service to mankind by the destruction of vast numbers of insects, which they pursue with great eagerness in the morning and evening twilight. During the daytime they remain suspended by their hooked hinder claws in the lofts of barns, in hollow or thickly-leaved trees, &c. As winter approaches, in cold climates, they seek shelter in caverns, vaults, ruinous and deserted buildings, and similar retreats, where they cling together in large clusters, and remain in a torpid condition until the returning spring recalls them to active exertions. We here observe the admirable arrangement of the great Author of nature, who has rendered it necessary that these animals should be torpid during all the time that their appropriate food is not to be obtained. In warm climates, where a constant succession of insects occurs, the same species of bat, which, in a cold region, would become torpid, continue in activity throughout the year.

Bats enjoy the senses of sight and hearing to a considerable degree of perfection, but the acuteness of their sense of touch is perhaps unequalled throughout the whole extent of animal organization. In consequence of the great expansion of integument forming the exceedingly delicate membrane of the wings, ears, and nasal appendages, bats are able, even when deprived of their eyes, to fly in such a manner as to avoid every obstacle. Silk threads,

small sticks, or obstructions placed across the course of flight of a bat purposely blinded by taking out its eyes, are avoided with the most surprising dexterity, and advantage is taken of any space to pass between without touching them. Every inequality in the ceiling of a hall or chamber is avoided in the same way. The reaction of the air against the membranes is sufficient to warn them of any obstacle, however slight, and enables them to turn, lower themselves, or draw in their wings, so as to clear the body, without the least appearance of effort. These soft, velvet-like wings also enable them to fly without noise, and, although their motion is unsteady and wavering, they advance with exceeding swiftness. From a flat or level surface, it is very difficult, though not entirely impossible, for them to rise into the air. They always suspend themselves by the hooks on their hind feet, whence they readily take wing by relinquishing their hold. The hook at the extremity and anterior edge of the fore-arm corresponds in situation to the human thumb, and the bats use it with peculiar advantage in changing their position, to perform their evacuations, &c.

We have observed the smaller species of bat, especially the young of the *Vespertilio arcuatus* (Say), to be exceedingly infested by the common bed-bug (*Cimex lectularius*), and have thence been led to conclude, that bats may be the means of conveying these noisome insects into houses, as they frequently take up their lodgings in chimneys belonging to bed-chambers, to which the bugs thus obtain easy access. Bed-bugs are often observed in entirely new houses, into which furniture altogether new has been introduced. On a single bat, obtained in the open air from a large occidental plane or button-wood tree, we have seen a profusion of bugs sufficient to have furnished a stock capable of soon infesting a whole neighbourhood. It may be well, occasionally, to smoke such lodgers out of chamber chimneys during summer, to prevent the introduction of their annoying and disgusting companions.

Bats generally bring forth two young, and suckle them until old enough to purvey for themselves. While suckling, they remain closely attached to the mother's teats, which are two, situated upon the chest. The parent shows a strong degree of attachment for her offspring, and, when they are captured, will follow them, and even submit to captivity herself, rather than forsake her charge.—The voice of the small bats, when irritated, is a sharp, chattering sort of squeak. They bite with much force, and those of considerable age and size can inflict a very severe injury, as their teeth are pointed and keen.

BATALHA, a village in Portugal, 69 miles north of Lisbon, with a convent of Dominicans, founded by King John I., in commemoration of a victory over the King of Castile, near Aljubarrota, in the year 1385. This convent is one of the most splendid buildings in Europe. It is in the Norman-Gothic style, 576 feet long and 443 wide, and was designed by an Irishman named Hacket. The church, in which lie the remains of the founder and the following three kings of the house of Aviz, as well as those of Prince Henry the Navigator, is a beautiful edifice, and adorned with many art-treasures.

BATANGAS, a town of the Philippines, in the island Luzon, capital of a province of same name, 58 miles S. of Manilla. It was founded in 1581 on the large bay of Batangas, opening into the Strait of Mindoro, and is well-built, containing several spacious streets, in which are many elegant mansions. The most important public edifice is the palace, where the alcalde resides. The trade, carried on chiefly with Manilla, consists of various aricles of native produce. Pop. of town, 17,380; of province, 247,676.

BATATAS. See SWEET POTATO.

BATAVIA, a city and seaport of Java, on the north coast of the island, near the west end, and the capital of all the Dutch East Indies; lon. 106° 50′ E.; lat. 6° 8′ S. It was founded by the Dutch in 1619, taken by the British in 1811, but restored to the Dutch in 1816. It attained its greatest prosperity in the beginning of the eighteenth century, when it had about 150,000 inhabitants. The population now amounts to between 60,000 and 70,000, chiefly of Malay extraction, with a considerable admixture of Chinese, and a small number of Europeans (Dutch, English, and Portuguese). It is situated on a wide, deep bay, in which are interspersed many low, green islets, within which ships find safe anchorage, the roadstead being sheltered from the north-west monsoon. The largest of these islets is Onrust, at which all ships above 300 tons burden have to anchor. The town consists of two portions. The old is situated in a low, marshy plain near the sea, and is intersected by the Great River and sundry canals. The miasmata, generated in the putrid mud-banks and canals, render this part of the town exceedingly unhealthy, and subject to an intermittent fever, very fatal to strangers. Much has been done, however, to diminish the unhealthiness by draining marshes, and letting currents of water into the stagnant canals. In consequence of the removal of the Europeans to the suburbs, many houses of the old town present a very dilapidated appearance; still it is the business part of the town, and contains the principal warehouses and offices of the Europeans, the Java Bank, and the exchange. The most important of the suburbs is Weltevreden, which is built on a plain lying above Batavia, at some distance from the coast, and which now contains barracks for the soldiers, the governor-general's palace, and the government buildings. Batavia is still the chief mart in the east of Asia for the products of the Eastern seas and the manufactures of the West; although it has now an important rival in Singapore. The suburbs have more the appearance of a garden than a town, each house being built apart and surrounded by cocoa-nut trees, bananas, &c. On the west side of the Great River is the Chinese quarter, inhabited entirely by Chinese. The public edifices are neither numerous nor splendid. The principal are the stadt-house, a Calvinistic, a Lutheran, and a Portuguese church, several Mohammedan mosques, and some Chinese temples. There are also some charitable institutions. See JAVA.

BATAVIAN REPUBLIC, the name adopted by the Seven United Provinces soon after the French revolution, and acknowledged by the powers of Europe. The whole republic was declared one and indivisible; all members of society were declared equal in the eye of the law, without respect to rank or birth; all religious societies, acknowledging a Supreme Being, equally protected by law. Feudality was abolished, all fiefs declared allodial, and possessors of lordships to be indemnified. In 1806 the form of government was changed into a kingdom, under the name of *Holland;* and the Batavian republic merged into a form of government nominally under the sway of Louis Bonaparte, but really under that of Napoleon. (See BELGIUM and NETHERLANDS.)

BATAVIANS, an old German nation which inhabited a part of the present Holland, especially the island called *Batavia*, formed by that branch of the Rhine which empties itself into the sea near Leyden, together with the Waal and the Meuse. Their territories, however, extended much beyond the Waal. Tacitus commends their bravery. According to him,

they were originally the same as the *Catti*, a German tribe which had emigrated from their country on account of domestic troubles. This must have happened before the time of Cæsar. When Germanicus was about to invade Germany from the sea, he made their island the rendezvous of his fleet. Being subjected by the Romans, they served them with such courage and fidelity as to obtain the title of their friends and brethren. They were exempted from tributes and taxes, and permitted to choose their leaders among themselves. Their cavalry was particularly excellent. During the reign of Vespasian they revolted, under the command of Civilis, from the Romans, and extorted from them favourable terms of peace. Trajan and Adrian subjected them again. At the end of the third century the Salian Franks obtained possession of the island of Batavia. After the constitution of the United Provinces was changed by the French in 1798, they formed the Batavian Republic, until Louis Bonaparte became King of Holland (1806).

BATH, a city in Somersetshire, 12 miles E. Bristol, 67 S.W. Oxford, 107 W. London; lon. 2° 22′ W.; lat. 51° 23′ N. It is beautifully situated on the Avon, in a narrow valley bounded on the N.E. and S.W. by hills, and widening on the N.W. into rich and extensive meadows. The Avon is navigable from Bath to Bristol. Bath is remarkable for its medicinal waters, for its various sources of amusement, for the elegance of its streets, and the magnificence of its public buildings. The houses are of superior construction, built of freestone, obtained from the hills about the town. The Abbey Church, in the form of a cross, ranks as the purest specimen of Gothic architecture in the kingdom. The church of St. Michael has a richly embellished front, and a pierced spire, which is one of the most striking features of the place. In 1861–63 a handsome Roman Catholic church was erected, called the Priory Church of St. John the Evangelist. The chief schools are the college, the grammar, blue-coat, charity, and National schools. Besides the general hospital for the reception of invalids who desire the benefit of the waters, from all parts of the world, are several other hospitals and charitable institutions, the Bath and West of England Society, the Philosophical Society, the mechanics' institute, &c. The springs, three in number, yield respectively 128, 120, and 112 gallons per minute; and the baths are both elegant and commodious. The temperature of the springs varies from 112° to 116° Fahrenheit. They contain carbonic acid, chloride of sodium and of magnesium, sulphate of soda, carbonate and sulphate of lime, &c. They are found of great efficacy in cases of gout, rheumatism, indigestion, palsy, and biliary obstructions.

Bath was founded by the Romans, and called by them *Aquæ Solis*. Amongst the remains of that people discovered there, were some baths, exceeding in elegance, it is said, those of the present day. These baths were found about 20 feet below the present level of the soil. The city owed much, if not all, its early celebrity and prosperity, to the singular personage known by the name of Beau Nash, who came to reside there in 1703, and who, from the zeal and tact he displayed in arranging and conducting the balls, assemblies, and other amusements of the town, was unanimously voted master of the ceremonies—a position which he occupied undisputed for about half a century. Nash died in 1761, and was buried with great pomp in the Abbey Church. Anstey, the author of the New Bath Guide, in which the follies and vices of that fashionable resort are so cleverly satirized, was a native of this city. Jointly with Wells, it is the head of a diocese, and returns two members to the House of Commons. The pop. of Bath in 1871 was (mun. bor.), 52,542; (parl. bor.), 53,714; but it is often considerably increased by visitors.

BATH, a town, United States, Maine, on the west side of the Kennebec, 12 miles from the sea, and 36 north-east of Portland; population in 1870, 7371. Bath is pleasantly situated, and has great advantages for commerce, being at the head of winter navigation. The river here is seldom frozen over. It is one of the most commercial towns in Maine, and is largely engaged in ship-building. It has a number of excellent schools, including a high-school. One or two of the churches are handsome edifices.

BATH. Bathing undoubtedly took place first in rivers and in the sea, but men soon learned to enjoy this pleasure in their own houses. Even Homer mentions the use of the bath as an old custom. When Ulysses enters the palace of Circe, a bath is prepared for him, after which he is anointed with costly perfumes, and dressed in rich garments. The bath, at this period, was the first refreshment offered to the guest. In later times, rooms, both public and private, were built expressly for the purpose of bathing. The public baths of the Greeks were mostly connected with the gymnasia, because they were taken immediately after the athletic exercises. The Romans, in the period of their luxury, imitated the Greeks in this point, and built magnificent baths. The following description applies both to the Greek and Roman baths:—The building which contained them was oblong, and had two divisions, the one for males, and the other for females. In both, warm or cold baths could be taken. The warm baths, in both divisions, were adjacent to each other, for the sake of being easily heated. In the midst of the building, on the ground-floor, was the heating-room, by which not only the water for bathing, but sometimes also the floors of the adjacent rooms, were warmed. Above the heating-room was an apartment in which three copper kettles were walled in, one above another, so that the lowest was immediately over the fire, the second over the first, and the third over the second. In this way, either boiling, lukewarm, or cold water, could be obtained. The water was carried, by separate pipes, provided with cocks, from these kettles into the bathing-rooms, and a fresh supply was immediately poured into the kettles from a reservoir. Close to the heating-room were three separate rooms on each side, for the hot, the lukewarm, and the cold bath. The bathing-rooms had, in the floor, a basin of mason-work, in which there were seats, and round it a gallery, where the bathers remained before they descended into the bath, and where, also, the attendants were. There was also a sweating-room, which was heated by means of flues, and was called *laconicum*, from the fact that a similar kind of bath was in use among the Lacedæmonians. This room had an opening in the ceiling, through which the light fell, and from which was suspended a brazen plate, that could be raised or let down at pleasure, to increase or lessen the heat. For undressing, for receiving the garments, and for anointing after bathing, there were different rooms; and connected with the bath were walks, covered racegrounds, tennis-courts, and gardens. These buildings, together with a number of bathing-rooms, were necessary for a public bath, which was adorned with splendid furniture, and all the requisites for recreation, and resembled, in its exterior appearance, an extensive palace. Roman luxury, always in search of means for rendering sensual enjoyments more exquisite, in later times, built particular conduits for conducting sea-water to the baths, used mountain snow, and enlarged these establishments in such a

way that even their ruins excite admiration. (See Wichelhausen, On the Baths of the Ancients, Mannheim and Heidelberg, 1851.)

Among the Europeans, the Russians have peculiar establishments for bathing, which are visited by all classes of the people during the whole year. The Russian bath consists of a single hall, built of wood. In the midst of it is a powerful metal oven, covered with heated stones. Round about there are broad benches. In entering this hall, you encounter such a heat, that one who is not accustomed to it can bear it but a few moments. Those, however, who can endure it for some time, undress, and stretch themselves on a mattress upon one of the benches. Cold water is then poured upon the heated stones; a thick, hot steam rises, which envelopes the bather, and heats him to such a degree, that the sweat issues from his whole body. The thermometer, in this steam, usually rises to 40° or 50° Reaumur (122° to 142° Fahrenheit). After the Russian has enjoyed his bath in this way, he is gently whipped with wet birch rods, rubbed with soap, in order to lessen the perspiration, and afterwards washed with lukewarm and cold water; of the latter, some pailfuls are poured over his head; or else he leaps, immediately after this sweating-bath, into a river or pond, or rolls in the snow. The Russian of higher rank takes, after his bath, a draught of English ale or white wine, with toasted bread, sugar, and citrons, and rests upon a bed. The common Russian, after having cooled himself in the snow, drinks some brandy, and goes again to his work. The people regard these baths as a necessary of life, and they are to be found in every village. They are also met with in Finland.

Among the Asiatics, baths are in general use. The Turks, by their religion, are obliged to make repeated ablutions daily: besides these, men and women must bathe in particular circumstances, and at certain times. For this purpose there is, in every city, a public bath connected with a mosque; and rich private persons possess private bath-houses, adorned with all the objects of Asiatic luxury. Besides these baths, the Turks have also the dry-bath of the ancients. The buildings which they use for this purpose are built of stone, and usually contain several rooms, the floors of which are of marble. These rooms are heated by means of pipes, which pass through the walls, and conduct the heated air to every part. After undressing, they wrap themselves up in a cotton coverlet, put on wooden slippers, in order to defend the feet against the heat of the floor, and then enter the bath-room. The hot air soon produces a profuse perspiration; upon which they are washed, wiped dry, combed, and rubbed with a woollen cloth. At last the whole body is covered with soap, or some other application, which improves the skin. After this bath, they rest upon a bed, and drink coffee, sherbet, or lemonade. The Turkish ladies daily bathe in this manner; the men not so frequently.

A peculiar kind of baths are used in the East Indies, of which Anquetil gives the following account: An attendant stretches the bather upon a table, pours over him warm water, and begins, afterwards, with admirable skill, to press and to bend his whole body. All the limbs are extended, and the joints made to crack. After he has done with one side, he goes on with the other; now kneels upon the bather; now takes hold of his shoulders; now causes his spine to crack, by moving the vertebræ; now applies gentle blows to the fleshy and muscular parts. After this he takes a cloth of hair, and rubs the whole body, removes the hard skin from the feet with pumice-stone, anoints the bather with soap and perfumes, and finishes by shaving and cutting his hair. This treatment lasts about three-quarters of an hour, and produces the greatest refreshment. An agreeable feeling pervades the whole body, and ends with a sweet slumber of several hours.—Public baths are common in Europe, and there are, at present, few cities without them. Medicine has endeavoured to increase the wholesome effects of baths by various compositions and methods of application. Baths are distinguished by the nature of the fluid, by the degree of heat, and by their influence upon the body. They are prepared with water, milk, wine, &c.; are of different temperatures; and herbs, iron, soap, and other substances are mixed with them, as the purpose requires. There are also baths of earth, sand, air, vapour, and electric baths. They are applied either to the whole body, or only to a single part. The shower-bath affords an agreeable and healthful mode of bathing, and much use is made of it in medicine. Mineral baths are those, the water of which naturally contains mineral ingredients.

The principal natural warm baths in England are situated at Bath and Bristol in Somersetshire, and Buxton and Matlock in Derbyshire. The temperature of the Bath springs ranges from 112° to 116°; while that of the Buxton and Matlock waters scarcely exceeds 82°. The latter are chiefly used in the cure of chronic rheumatism, while the reputation of the former rests upon the benefits which they are believed to confer on gouty and paralytic sufferers. As to the cold bath, it is generally employed by the young and vigorous, and chiefly as a source of pleasurable sensation. Hence, the shores of our island, during summer, are covered with crowds of all ranks from the interior, who repair thither for the sake of enjoying the breezes of the sea, and renovating their frames by immersion in the ocean flood.

Independently of all modifications of temperature, bathing is found to be advantageous, from the various impregnations of mineral substances abounding in natural springs; such as iron, sulphur, and lime. The baths of Harrogate, for instance, being strongly impregnated with sulphuretted hydrogen gas, are of the greatest use in the cure of obstinate cutaneous diseases, as also of indurations of the glands.

Besides hot and cold bathing, the application of the steam of hot water has of late come into vogue in Great Britain, having been found very efficacious, as well as convenient, in the removal of various chronic diseases. For this purpose, water may be sprinkled on heated stones, or a flexible tube applied to a large boiler, and the vapour conveyed to the body of the patient, seated under a loose covering of oiled silk. The Swedes, Danes, and Russians are addicted to the use of the vapour bath, and do not hesitate to rush reeking hot from its application, and plunge themselves into the nearest river; a practice which, although enjoyed by them with impunity, has been attended with fatal consequences, in more instances than one, to those foreigners who have attempted to imitate so daring an example.

The most celebrated natural hot baths in Europe are those of Aix-la-Chapelle, and the various Baden in Germany; Toeplitz, in Bohemia; Bagnières, Barèges, and Dax, in the south of France; Spa, in Belgium; and those of England already enumerated.

BATH, Knights of the, an order of England, concerning the origin of which antiquaries differ. It is certain that Henry IV., on the day of his coronation, conferred the degree upon forty-six knights. From that time the kings of England have bestowed this dignity previous to coronations, after births and marriages of the royal issue, &c. Charles II. created several Knights of the Bath, but after his time the order fell into neglect, till 1725, when George I.

revived it. By the book of statutes then prepared, the number of knights was fixed at thirty-eight, viz. the sovereign, and thirty-seven knights companions. The king allowed the chapel of Henry VII., in Westminster Abbey, to be the chapel of the order. The limits of the order were greatly extended by the prince regent in 1815, to reward the distinguished services of officers during the wars; and again in 1847, when it was also opened to civilians. It now consists of three classes, each of which is subdivided into (1) military members, (2) civil members, and (3) honorary members, consisting of foreign princes and officers. The first class consists of Knights of Grand Cross (G.C.B.); the second of Knights Commanders (K.C.B.); and the third, of Companions (C.B.) The Dean of Westminster is dean of the order. The ribbon of the order is crimson, and its motto, 'Tria juncta in uno.'

BATHGATE, a town, Scotland, county Linlithgow, on an acclivity, and near the base of a ridge of hills, 19 miles W. of Edinburgh, and 25 miles E. of Glasgow, on the Edinburgh and Bathgate Railway. It comprises an old and new town; the former consisting of several narrow, crooked, and very dirty lanes; the latter of several principal streets, on a regular plan, straight and spacious, with broad footways. The town is lighted with gas, and abundantly supplied with excellent water, chiefly from springs. It has a Parish church, a Free church, a United Presbyterian church, &c., all very plain buildings. The schools are, the parish school, and the well-known academy, a handsome structure, situated on a rising ground a little east of the town, and several private schools. The principal manufactures are ginghams and pullicats, mostly for exportation; but for some years back the weaving of the finer sorts of worsted plaids and shawls has been carried on to a limited extent. There are, besides, a distillery, a brewery, and several grain mills. In the vicinity are chemical works and paraffin works; and a good many hands are engaged in the coal and ironstone mines in the neighbourhood. Pop. in 1871, 4991.

BATHING. The practice of bathing may be considered in a twofold point of view: either as a necessary means of purifying the surface of the body, or as a method of cure in various diseases. In the latter case, its application falls more particularly to the lot of the physician; in the former, each individual must judge, by his own practice and feelings, how far its employment may be extended or indulged in. There is no application of bathing which is more interesting to the public at large, than that whereby the symptoms and progress of febrile diseases may be at once cut short and terminated; and it is strange to think how little the use of bathing has been adopted in reference to this end. The public are deeply indebted to the researches of the late Dr. Currie, who was the first to call the attention of his medical brethren to this subject. It appears, from the instances adduced by that learned physician, that the application of cold or tepid water is of the greatest advantage in checking the progress of typhus and scarlet fever, and moderating the symptoms of a variety of febrile diseases. If a person labouring under fever be taken from his bed, and a stream of cold or tepid water poured over his head and body, then rubbed dry and replaced in bed, his temperature will be frequently reduced, even by a single affusion of water, from 104° or 106° to the natural standard, and the frequency of his pulse abated from 120 or 130 to 80 or 90 pulsations in the minute. The patient feels himself immediately relieved from the attendant headache and pain in his limbs, soon falls into a calm sleep, succeeded by a gentle perspiration, and frequently awakes, after a few hours, entirely freed from the fever. If, after a short time, this desirable result does not follow, then a second, or third, or even fourth application of cold or tepid water is generally successful. In applying this admirable remedy, due attention must be paid to the heat of the skin and increased action of the heart and arteries; for the hotter the skin, the colder may be the temperature of the water employed. But from experiments it appears that water at the heat of 90° of Fahrenheit is the most efficacious in abating the frequency of the pulse. —This remedy is also of great use in moderating the distressing symptoms of hectic fever; but in such cases it is desirable only to apply tepid bathing to the hands and feet of the sufferer during the hot stages. —Warm bathing has been considered useful in checking the approach of old age and prolonging life; and, indeed, there can be little doubt that, when employed under proper precautions, it has a tendency to produce both these results. The Romans, in their days of sensuality, were accustomed to use the warm bath for the purpose of relieving themselves from the effects of their gluttony, and also after having been exposed to any unusual exercise or fatigue. After the time of Pompey, they appear to have carried the practice to an absurd and ridiculous excess, insomuch that one of their emperors, Titus, is said to have fallen a victim to it; and at length Hadrian, by a public edict, imposed a restraint upon the immoderate use of bathing. The Romans were in the habit of bathing at three o'clock in the afternoon, and this is perhaps the best hour in our own country, as the stomach is then empty. But when the warm bath is employed as a remedy, for the purpose of producing perspiration, it is better to enter it at nine o'clock in the evening and go to bed immediately on coming out. Delicate persons and children ought not to bathe in the sea sooner than ten or eleven o'clock in the morning, nor ought they to go in fasting, or remain in it longer than a few minutes; and, indeed, young children should not be suffered to continue in the water longer than is necessary for a single plunge.—Whenever the cold bath produces shivering, we may conclude that it disagrees with one. Bathing in rivers and cold streams is generally more dangerous than in the open sea, owing to the greater coldness of the former, and the tendency of fresh water to evaporate more quickly from the skin. The greatest imprudence a person can commit is to use a cold bath in the morning after any debauchery or excess in eating or drinking the preceding evening. Most of the fatal accidents arising from cold bathing are to be traced to this source. Even Alexander the Great is said to have lost his life from this imprudence. The dangers attending the warm bath are attributable to using water at too high a temperature, as, for example, all baths heated above 105°; and apoplexy and death have been known to follow immediately after the use of a very hot bath, particularly when entered with a full stomach. It may be of consequence, however, to remark, that there are some persons endued with so singular a sensibility as to feel a bath of 110° not too warm, and to be absolutely chilled by a bath of 100°; and, in such cases, it is probable that at 105° the pulsations of the heart would not be materially accelerated. But these are rare and extreme cases, quite out of the course of our experience.—Most authors who write on bathing recommend that, in using the cold bath, the head should be plunged in first, and where there is reason to apprehend headache, this may be a proper precaution, otherwise it is of little moment. Cold bathing ought to be avoided by all persons who have any tendency to spitting of blood

or consumption, or where there is any latent visceral disease or tendency to apoplexy. Gouty people, also, cannot use the cold bath without danger; but, on the other hand, there are few persons to whom a tepid bath is of greater service. Horace tells us that in his days the Romans were apt to exceed in cold bathing in the Tiber, and warns his countrymen against the danger of such heroism as swimming thrice across that river. The Serpentine river in London is dangerous to bathers, chiefly from the icy coldness of the springs with which it abounds, which produce an instantaneous palsy or cramp in the muscles and limbs of the best swimmers. There are dangerous spots, generally, in all deep rivers, and it is proper to warn all young persons of the existence of such places, as hundreds of lives are lost annually from an ignorance of the cause of such fatal accidents.

BATHORI, or BATTORI, a celebrated Hungarian family, which in the fifteenth century became divided into two branches, one of which gave Transylvania five princes, and Poland one of its greatest kings:—1. STEPHEN, born in 1532, originally in private life, entered the army, and by his valour and prudence had so distinguished himself that when the death of John Sigismund Zapolya, nephew of Sigismund II., king of Poland, in 1571, had left a vacancy in the sovereignty of Transylvania, Stephen Bathori, without courting the honour, was unanimously elected. When the throne of Poland became vacant by Henry of Valois quitting the country in order to mount the throne of France, Stephen Bathori was elected to succeed him in 1575, and was crowned along with his queen, Anne, daughter of Sigismund Augustus, at Cracow, in 1576. He found the kingdom torn asunder by faction, the people enervated by long peace, the treasury exhausted, and the army without discipline. He therefore gave his first attention to internal improvement, but had no sooner effected it than he determined to recover the Polish territories, of which the czar of Muscovy had managed to possess himself by fomenting dissensions. He accordingly declared war against him, beat him at all points, and compelled him to accept a disadvantageous peace. Under Stephen Bathori, Poland enjoyed a comparative tranquillity to which it had long been a stranger, and he was meditating important constitutional reforms, which promised to make that tranquillity permanent, when he died suddenly at Grodno, in 1586.——2. SIGISMOND, nephew of Stephen, became waiwod or prince of Transylvania in 1581, shook off the Ottoman yoke, and, by the great talents he displayed, had begun to give hopes of reigning gloriously as an independent sovereign, when, from mere fickleness and eccentricity of character, he voluntarily resigned his dominions to the emperor Rudolph II., in return for two principalities in Silesia, a cardinal's hat, and a pension. With the same fickleness, however, he immediately repented of the act, and availing himself of an invitation by the Transylvanians, returned, and placed himself under the protection of the Porte. The talent which he had displayed, and the good fortune which had followed him in early life, appeared now to have forsaken him: the Imperialists defeated him in every battle, and he was obliged to throw himself on the mercy of the emperor, who sent him to live at Prague, where he died almost forgotten in 1613.

BATHOS, a Greek word meaning depth, now used to signify a ludicrous sinking from the sublime to the mean in poetry. This application of the word was introduced by Swift, who, in his Art of Sinking in Poetry, opposes the *bathos* to the *sublime*.

BATH-STONE, one of the three kinds of oolitic limestone, which is extensively used in building, and is so called from being found in the neighbourhood of Bath. This member of the oolite formation has been called the great oolite, and it is of considerable thickness. When it is just quarried it is soft, but it soon becomes hard on exposure to the atmosphere. It is, however, not very durable, and buildings for which it is used after no very long time begin to crumble away.

BATHURST, a settlement on the west coast of Africa, formed by the British on the island of St. Mary's, near the mouth of the Gambia; lat. 13° 25′ N. It was formed in connection with the colony of Sierra Leone; the object being to establish an equitable commerce, instead of the slave-trade. It consists partly of commodious, and even handsome houses, but mostly of African huts with small gardens. The market is thronged by individuals of different tribes, and abundantly supplied with beef, mutton, poultry, fish, milk, and butter. The trade is chiefly in gum, bees'-wax, hides, ivory, and gold, bartered for British cloths and cutlery.

BATHURST, ALLEN, EARL, the son of Sir Benjamin Bathurst, was born in London, in 1684. He was educated at Oxford, and represented the borough of Cirencester in two parliaments, during the reign of Anne, whose Tory administration he strongly supported; and, in return, was raised to the peerage in 1711. He was a warm opponent to Sir Robert Walpole, and, in 1757, was appointed treasurer to Prince George, then Prince of Wales, on whose accession to the throne he obtained a pension of £2000 per annum. He received an earldom in 1772. Lord Bathurst is distinguished as the intimate friend of Bolingbroke, Addison, Pope, Swift, Gay, and all the celebrated wits of the age, and was himself a man of bright parts and convivial disposition. He died in 1775, at the advanced age of ninety-one.

BATHYBIUS (Gr. *bathys*, deep, and *bios*, life), the name given by Huxley to the masses of animal matter which have been found covering the sea-bottom, sometimes at the depth of 25,000 feet, in such abundance as to form in some places deposits of 30 feet or more in thickness. It consists of a tenacious, viscid, slimy substance, exhibiting under the microscope a network of granular, mucilaginous matter, which expands and contracts spontaneously and thus forms an organism of the utmost simplicity corresponding in every respect to protoplasm (which see). Embedded in this substance are found peculiar calcareous bodies, with an organic structure (*discoliths*, *coccoliths*, and *coccospheres*), which seem to belong to the Bathybius as such, while extraneous substances, such as bones of fish, pieces of the shells of crabs, &c., have found their way into it casually. Several of the Rhizopoda have also been found living in it.

BATIGNOLLES-MONCEAUX, a commune on the N.E., and properly a suburb of Paris. In 1814 it was an open unoccupied space, which the Prussians, under Blücher, used as their camp. It is now covered with handsome buildings, and has a pop. of 44,000.

BATLEY, a municipal and parliamentary borough of England, in the West Riding of York, 8 miles south of Leeds, and about a mile from Dewsbury, with which it is united for parliamentary purposes. The houses are chiefly of stone, and rather irregularly built. Batley has an ancient parish church in the early English style, a town-hall, free grammar-school, mechanics' institute, &c. The principal manufactures are heavy woollen cloths, such as pilot, beaver, police, army, and frieze cloths, flushings, and blankets. Indeed it may fairly be considered the chief seat and centre of the manufacture of heavy woollens, in which trade there are about fifty mills and factories engaged in the town and vicinity. Pop. of municipal borough in 1871, 20,871.

BATONI, Pompeo Girolamo, an Italian painter, the last who is of importance in the history of Italian painting, was born at Lucca in 1708; died at Rome in 1787. The manner in which he executed his paintings was peculiar. He covered his sketch with a cloth, and began to paint the upper part on the left hand, and proceeded gradually towards the right, never uncovering a new place before the first was entirely finished. Boni, who compares him with Mengs, calls the latter the *painter of philosophy;* the former, the *painter of nature.* Batoni painted many altar-pieces, and numerous portraits; for instance, that of the emperor Joseph and the empress Maria Theresa, in the imperial gallery. His greatest work is his Fall of Simon the Sorcerer, which was ordered by Cardinal Albani, for the church of St. Peter's at Rome, and was intended to be executed in mosaic, at that time regarded as the highest honour. His Magdalena, in Dresden, and his Return of the Prodigal Son, in Vienna, are also celebrated.

BATON ROUGE, a town in the United States of America, cap. of Louisiana, on the left bank of the Mississippi, 129 miles N.W. New Orleans. It stands on a high bluff commanding a fine view of the river and surrounding country, and has a handsome state-house, a college, an arsenal, barracks, and penitentiary. In 1862 the possession of it was contested between the Federal and Confederate forces, and in Aug. 5 of that year, the Confederates under General Breckenridge suffered a severe defeat before it. Pop. 6498.

BATRACHIANS, according to the system of Cuvier, an order of reptiles, of which the frog, called in Greek *batrachos*, may be considered as the type; but some naturalists, following Blainville and Duvernoy, arrange this order as a separate class of the vertebrata, and give it the name of Amphibia. Others again, while arranging the Amphibia as a separate class of the vertebrata, apply the term Batrachia in a narrower sense to an order of this class, including the frogs and toads, or the tailless amphibians. Hence the name Anoura is sometimes given to this order, from *an*, the Greek negative prefix, and *oura*, the Greek word for a 'tail.' The chief characteristics of the batrachians, when the term is employed in the more extended sense of Cuvier, are a skin devoid of hair, and for the most part of scales, and covered only with a layer of mucus; a single heart; a head with two occipital condyles, not carried upon a narrower neck; and young produced from eggs enveloped in a membrane, and not in a solid shell, and presenting at their birth a different form from that which they acquire in the course of their development, and afterwards preserve during the rest of their lives. This last feature is the most remarkable of all. At first the young live in the water, and breathe like fish by means of gills placed on the sides of the neck: they swim by means of their tail, and have no limbs. By degrees lungs become developed, and the gills of most of them, after shrivelling up, fall off: at the same time most of them are gradually furnished with four limbs, some only with two, and some remain always destitute of them. The above-mentioned fact of the gills falling off in most cases, but not in others, is the foundation of the division that is usually made of the order of the batrachians into two sub-orders, the first, the Caducibranchiata, including those whose gills do fall off, and the second, the Perennibranchiata, those whose gills do not fall off. The Caducibranchiata are again subdivided into the tailless, as the frogs, and the tailed, as the newts. Compared with other orders of reptiles, they differ—(1) From the chelonians in having no claws to their feet, and little or no development of their sides, in laying membranous eggs, and in producing from them young which are afterwards to be metamorphosed; (2) From the saurians in most of the above characters, and moreover by the form of their vent, which is always round and terminal, or arranged longitudinally when situated at the origin of the tail; and (3) From the ophidians by the presence of feet in the most of the species, as well as by the eyelids and the presence of a sternum.

BATRACHOMYOMACHIA (Gr.; *batrachos*, a frog; *mys*, a mouse; and *machē*, a battle), the battle of the frogs and the mice—a mock-heroic poem, falsely ascribed to Homer, and, apparently the Iliad travestied, probably composed by an Alexandrian, in which a war between the frogs and the mice is described with much humour.

BATTA, a country in the north of Sumatra, which stretches between Sinkell and Tabuyong, on the west side of the island, and the Bila and the Rakan on the east side. The whole pop. is estimated at about 300,000. The soil is fertile, and produces chiefly camphor, gum benzoin, cassia, cotton, and indigo. The language of the Battas is a settled one, and extensively written. They have many neatly printed books.—There is another Batta, a province in Africa, formerly an independent state, now subject to Congo. Principal towns, Batta and Cangon.

BATTA, an allowance which military officers in India receive in addition to their pay. It was originally given only when the officers were under march or in the field, and not in cantonments, and was intended to enable them to provide for the additional expenditure to which, in the former case, they were necessarily subjected. It afterwards was paid under all circumstances, but in 1828 the original principle was resumed, and a considerable difference is now made between active and cantonment service.

BATTALION, the tactical unit of command in infantry, whereas the regiment is an administrative unit, and may or may not consist of more than one battalion. In the British army the majority of the regiments consist of but one battalion, some of two, one consists of three, and two consist of four. The battalion again is made up of companies, one of these being the grenadier, another the light infantry company; and the companies are further subdivided into squads. The English battalions at home have normally a strength of 800 rank and file; but their complement of men is not absolutely fixed; and in the Crimea in 1855, the battalions consisted of 2000 rank and file, divided into twelve service companies, four reserve, and four depot companies. The number of men in the Prussian battalions on the war footing is 1000, divided into four companies. The Austrian battalion is rather stronger, and is divided into six companies; the French battalion is also divided into six companies.

BATTERING-RAM. The ancients employed two different machines of this kind—the one suspended, and vibrating after the manner of a pendulum, and the other movable on rollers. The swinging ram resembled in magnitude and form the mast of a large vessel, suspended horizontally at its centre of gravity, by chains or cords, from a movable frame. Ligatures of waxed cord surrounded the beam at short intervals, and cords at the extremity, opposite to the head, served for the purpose of applying human force to give the oscillatory motion. Other cords, at intermediate distances, were also sometimes employed. The rolling ram was much the same as the above in its general construction, except that instead of a pendulous motion, it received only a motion of simple alternation, produced by the strength of men applied to cords passing over pulleys. This construction seems to have been first employed

at the siege of Byzantium. These machines were often extremely ponderous. Appian declares that, at the siege of Carthage, he saw two rams so colossal that 100 men were employed in working each. Vitruvius affirms that the beam was often from 100 to 120 feet in length; and Justus Lipsius describes some as 180 feet long, and 2 feet 4 inches in diameter, with an iron head weighing at least a ton and a half. In contrasting the effects of the battering-ram with those of the modern artillery, we must not judge of them merely by the measure of their respective momenta. Such a ram as one of those described by Lipsius would weigh more than 45,000 lbs., and its momentum, supposing its velocity be about 2 yards per second, would be nearly quadruple the momentum of a 40 lb. ball moving with a velocity of 1600 feet per second. But the operation of the two upon a wall would be very different. The ball would penetrate the opposing substance, and pursue its way almost undisturbed; but the efficacy of the ram would depend almost entirely upon duly apportioning its intervals of oscillation. At first it would produce no obvious effect upon the wall; but the judicious repetition of its blows would, in a short time, give motion to the wall itself. First, there would be a just perceptible tremor, then more extensive vibrations; these being evident, the assailants would adjust the oscillations of the ram to that of the wall, till at length a large portion of it, partaking of the vibratory impulse, would, by a well-timed blow, fall to the earth at once. This recorded effect of the ram has nothing analogous in the results of modern machinery.

BATTERSEA, a parish and village, England, Surrey, in a low situation, on the right bank of the Thames, across which there is here a wooden bridge, connecting it with Chelsea on the opposite side. A great portion of the parish is laid out in market gardens, the produce of which is sent to the London market. The parish church is a neat brick building, and contains, amongst other interesting monuments, one to the celebrated Lord Bolingbroke, sculptured by Roubilliac. Area of parish, 31,183 acres. Pop. in 1871, 53,988.

BATTERY, in the military art:—(1) any raised place in which cannon are planted; (2) all the lines of a fortress, behind the parapets of which are cannon. They are erected in the open field, in citadels, on a lake or the sea, before a place which is to be besieged, &c. With regard to the kind of artillery, they are distinguished into cannon, howitzer, mortar, &c. With regard to their object, they are divided into breach batteries, used to attack the faces or salient angles of the bastion or ravelin, in order to make an accessible breach; batteries *en écharpe*, or oblique batteries, which are erected beside the breach batteries, under an angle of 20–30 degrees, in order to batter a breach obliquely; *ricochet* batteries, which command the enemy's lines, so that the balls roll along the whole length of the rampart, and render it insecure, &c. Their position is perpendicular to the line which is to be enfiladed. Mortar batteries have the parapets inwards, and no embrasures. In respect to their position, they are divided into horizontal, raised, and sunk batteries. The disposition of floating-batteries may be various. Such a battery commonly consists of a raft, in the middle line of which cannon are placed, having before them breastworks made of bags of wool. The raft is fastened, by a strong cable, to a beam or anchor, round which it is to be moved, and brought, by the aid of oars or rudders, to the proper place.—(For an account of the floating-batteries invented by d'Arçon, which were used, in 1782, against Gibraltar, see Elliot.) During the Crimean War armour-plated floating-batteries moved by steam-power were used on the suggestion of Napoleon III. (See Navy and War-steamers.) A battery, or in this sense more properly a field-battery, also signifies a number of pieces of artillery, varying from four to eight, which are for tactical purposes under the command of one person. The term includes also the ammunition waggons, the stores, horses, men, and whatever else is necessary for the service of the guns. In the British army a field-battery consists of six pieces.

In experimental physics, *battery* is a combination of several jars or metallic plates, to increase the effect of electricity and galvanism. (See Leyden-phial and Galvanism.)

BATTERY. See Assault.

BATTEUX, Charles, honorary canon of Rheims, born in 1713 at Alland'huy, a village near Vouziers, in the department of Ardennes. He displayed his gratitude to this city, in which he received his education, by the ode *In Civitatem Remensem*, 1739, which was much admired. In 1750 he was invited to Paris, where he taught rhetoric in the colleges of Lisieux and Navarre. He was afterwards appointed professor of Latin and Greek philosophy at the Royal College. In 1754 he became a member of the Academy of Inscriptions, and in 1761 of the French Academy. His constitution, naturally strong, sank under his exertions, and he died July 14, 1780. His eulogy was pronounced by M. Delille, then director of this society. Batteux left a large number of valuable works. He has done much service to literature and the fine arts, by introducing unity and system into the numerous canons of taste, which had gained a standing among the French by the example of many eminent men, particularly in regard to poetry, and must be regarded as a valuable writer on esthetics, notwithstanding the higher point of view from which this science is now considered. Some of his most valuable works are Les Beaux-Arts réduits à un même Principe, Paris, 1747; and Cours de Belles-Lettres ou Principes de la Littérature, Paris, 1774, and several times afterwards. These works have been translated into many other languages.

BATTHYANYI, Count Louis, a distinguished Hungarian patriot, was born at Presburg in 1809, and entered the army as a cadet at the age of sixteen. On coming into possession of a large fortune on attaining his majority, he abandoned a military for a diplomatic career, and in process of time attained the rank of leader of the opposition in the Hungarian diet. Upon the breaking out of the commotions of 1848, Batthyanyi took an active part in promoting the national cause, and with a company of armed vassals came forward to assist it in the field. After the entry of Windischgrätz into Pesth in January, 1849, he was arrested in the house of his sister-in-law, the Countess Karolyi. After being conveyed to various places he was finally brought back to Pesth, tried by a court-martial, and condemned to be hanged. The execution of this sentence he prevented by inflicting several wounds with a poniard on his neck, and he was accordingly shot on the evening of 6th October.

BATTLE, a market-town and parish, England, county of Sussex. The town, in a valley nearly encircled by wooded hills, 7 miles N.W. of Hastings, consists chiefly of one irregular street, in which there are many old-fashioned buildings, is well supplied with water, and lighted with gas. The church is ancient, and contains some fine specimens of painted glass and numerous antique monuments. There are places of worship also for Baptists, Wesleyans, Swedenborgians, and Unitarians, and endowed and

charity schools. Battle has been long celebrated for the manufacture of gunpowder. Tanning is likewise carried on to a considerable extent. The original abbey built by William the Norman has disappeared, but interesting remains of a subsequent building, erected on the same spot, exist, including the gateway, a beautiful specimen of the decorated English style. The town was anciently called Epiton, but changed to its present name after the battle of Hastings. Pop. 3293.

BATTLE. The object of a war may be obtained in two different ways: either one party forces the enemy, by skilful manœuvres, marches, demonstrations, the occupation of advantageous positions, &c., to quit the field (which belongs to the province of *strategy*); or the hostile masses approach each other, so that a battle becomes necessary to determine which shall keep the field. Troops may either meet by design or by chance. When they meet by chance, and are thus obliged to fight, it is called a rencontre. The rules for insuring a successful issue, whether they respect the preparations for the conflict, or the direction of the forces when actually engaged, belong to *tactics*, in the narrower sense of the word. *Strategy* also shows the causes which bring armies together, and produce battles without any agreement between the parties. It belongs not to this article to explain this point. It may be sufficient to say, in general, that armies in their marches (and consequently in their meeting) are chiefly determined by the course of the mountains and rivers of a country. In ancient times and the middle ages the battle-ground was often chosen by agreement, and then the battle was a mere trial of strength, a duel *en gros;* but, in our time, such trifling is done away with. War is now carried on for the real or pretended interest of a nation, or a ruler who thinks or pretends that his interest is that of the nation. Wars are not undertaken for the purpose of fighting, and battles are merely the consequence of pursuing the purpose of the war. They arise from one party's striving to prevent the other from gaining his object. Every means, therefore, of winning the battle is resorted to, and an agreement can hardly be thought of. In this respect a land battle is entirely different from a naval battle. The former is intended merely to remove an obstacle in the way of gaining the object of the war; the destruction of the enemy, therefore, is not the first thing sought for. But the object of a naval engagement is, almost always, the destruction of the enemy; those cases only excepted, in which a fleet intends to bring supplies or reinforcements to a blockaded port, and is obliged to fight to accomplish its purpose.

As the armies of the ancients were not so well organized as those of the moderns, and the combatants fought very little at a distance, after the battle had begun manœuvres were much more difficult, and troops, when actually engaged, were almost entirely beyond the control of the general. With them, therefore, the battle depended almost wholly upon the previous arrangements, and the valour of the troops. Not so in modern times. The finest combinations, the most ingenious manœuvres, are rendered possible by the better organization of the armies, which thus, generally at least, remain under the control of the general. The battle of the ancients was the rude beginning of an art now much developed. It is the skill of the general, rather than the courage of the soldier, that now determines the event of a battle.

Battles are distinguished into *offensive* and *defensive*. Of course, a battle which is offensive for one side is defensive for the other. Tacticians divide a battle into three periods—that of the disposition, that of the combat, and the decisive moment. The general examines the strength, reconnoitres the position, and endeavours to learn the intention of the enemy. If the enemy conceals his plan and position, skirmishes and partial assaults are often advisable, in order to disturb him, to obtain a view of his movements, to induce him to advance, or with the view of making prisoners, who may be questioned, &c. Since the general cannot direct all these operations in person, officers of the staff assist him; single scouts or small bodies are sent out, and spies are employed. Every means is made use of for obtaining information of the enemy, or the ground on which the battle is likely to take place. According to the knowledge thus acquired, and the state of the troops, the plan of the battle, or the disposition, is made; and here military genius has an opportunity to display itself. Napoleon's dispositions were real master-pieces. To the disposition also belongs the detaching of large bodies which are to co-operate in the battle, but not under the immediate command of the chief. The plan of the battle itself, the position of the troops, &c., is called the *order of battle* (*ordre de bataille*). This is either the parallel, or the inclosing (if the enemy cannot develop his forces, or you are strong enough to outflank him), or the oblique. (See ATTACK.) When each division of troops has taken its position, and received its orders, and the weaker points have been fortified (if time allows it), the artillery placed on the most favourable points, all chasms connected by bridges, villages, woods, &c., taken possession of, and all impediments removed as far as possible (which very often cannot be done, except by fighting), then comes the second period—that of the engagement. The combat begins, either on several points at a given signal, as is the case when the armies are very large, and a general attack is intended, as, for instance, at Leipzig, where three fire-balls gave the signal for battle on the side of the allies; or by skirmishes of the light troops, which is the most common case. The artillery endeavours to dismount the batteries of the enemy, to destroy his columns, and, in general, to break a passage, if possible, for the other troops. The forces, at the present day, are brought into action mostly in columns, and not, as formerly, in long but weak lines. Here the skill of the commanders of battalions is exerted. Upon them rests the principal execution of the actual combat. The plans and orders of a general reach only to a certain point; the chiefs of battalions must do the great work of the battle. Before the battle, the general places himself upon a point from which he can see the conflict, and where he can easily receive reports. A few men are near him as his body-guard; others take charge of the plans and maps; telescopes are indispensable. He often sends one of his aids to take instant command of the nearest body of cavalry, in order to execute an order which must be carried into effect quickly. He receives the reports of the generals under him, and gives new orders; disposes of the troops not yet in action; strengthens weak points; throws his force on the enemy where he sees them waver; or changes, if necessary, with a bold and ingenious thought, the whole order of battle. The general now uses every means to bring on the third period of the battle—the decisive moment. Anything which can carry disorder into the ranks of the enemy is of great use. If he begins to waver, or to retreat in order, or to flee in disorder, it is always necessary to follow up the victory with all possible vigour and celerity. This is as important as victory itself. Napoleon was, till the last war in Germany, a master in this particular. There are three maxims as important for the general as they are simple:—

(1) Know your enemy, his strength and intentions; (2) make all the operations and manœuvres of the parts coincide, as much as possible, with the great plan of the battle; (3) pursue victory to the utmost. Several games have been invented to explain the manner of conducting war and battles, in which the effect of cannon, &c., is represented by dice; pieces of lead, differently coloured, represent the different troops. Such games are popular among the German officers.

BATTLE, WAGER OF. See APPEAL.

BATTLE-AXE, a weapon much used in the early part of the middle ages, particularly by the people who fought on foot. It was not uncommon, however, among the knights, who used also the mace, a species of iron club or hammer. Both are to be seen in the different collections of old arms in Europe. Both these weapons, and another kind, called in German *Morgenstern* (morning-star), consisting of a staff, having an iron ball at the end, with cross iron spikes, served to give stunning blows, whose force was felt through the iron armour of the knights. Knights used chiefly the *Morgenstern* and the mace. The Greeks and Romans did not employ the battle-axe, though it was found among contemporary nations. In fact, the axe is one of the earliest weapons, its use as an instrument of domestic industry naturally suggesting its application for purposes of offence; but, at the same time, it will always be abandoned as soon as the art of fencing, attacking, and guarding is cultivated; because the heavier the blow given with this instrument, the more will it expose the fighter. It is a weapon which affords hardly any guard, and it never would have remained so long in use in the middle ages, had it not been for the iron armour, which protected the body from everything but heavy blows. In England, Ireland, and Scotland, the battle-axe was much employed. At the battle of Bannockburn, King Robert Bruce clave an English champion down to the chin with one blow of his axe. The Lochaber-axe remained a formidable implement of destruction in the hands of the Highlanders to a recent period, and was used by the old city guard of Edinburgh.

BATTLE-PIECE, a painting which represents a battle, exhibiting large masses of men in action. The armour of the ancients, and the whole array and action of their battles, afford subjects much more favourable to the artist than the straight lines or condensed columns and the fire-arms of the moderns. A painter of battle-pieces ought to have an accurate knowledge of the appearance of horses and men, and, if possible, to have seen a battle, as few persons are able to form from hearsay an accurate idea of such a scene. Some of the greatest pieces of this kind are the Battle of Constantine, of which the cartoons were drawn by Raphael, and which was executed by Giulio Romano; Lebrun's Battles of Alexander; and the Battles of the Amazons, by Rubens. From these may be distinguished the skirmishes, surprises, &c., which are represented with so much skill by Antonio Tempesta, John Snellink, Jos. van der Velde, John Asselyn, Peter Snayers, Robert von Hoek, Fulcone, called *oracolo delle battaglie*, James Courtois, Francis van der Meulen, Philip Wouvermans, Charles Breydel, Henry Verschuuring, and George Philip Rugendas.

BATTOGES, BATTACKS, two thin sticks, with which criminals in Russia were formerly beaten upon their naked backs. The criminal was laid upon the ground, and one of the executioners sat upon his head, another upon his feet. By the code of Catharine II. this punishment was abolished.

BATTUECAS, LAS, two valleys, inclosed by high mountains, in the Spanish province of Salamanca, about a Spanish mile long, and so inaccessible, that the inhabitants are said to have been unknown to the Spaniards for several centuries. However, a convent of Carmelites was built in the Battuecas valleys as early as 1559. They are situated so low, that, in the longest days, the sun only shines there for four hours. The common account, that these valleys were discovered in the sixteenth century by two lovers, who fled there to escape the pursuit of their families, has been declared by Father Feyjoo to be unfounded. Madame de Genlis has founded upon this story her romance Las Battuécas (Paris, 1816, two vols.); but she labours under a mistake when she asserts that M. de Bourgoing, in his Travels through Spain, has quoted as an historical fact what she relates of the Battuecas.

BATURIN, a town, Russia, government of, and 78 miles E. from Czernigov; pleasantly situated on a hill near the Seïm, a tributary of the Desha. It contains a hands me chateau, belonging to the counts of Rasumowski; a convent, and eight churches. The inhabitants depend chiefly on agriculture, and several yearly markets. Baturin was once the residence of the hetmans of the Cossacks; and had a fastness, which, on the revolt of the celebrated Mazeppa in 1708, was demolished.

BAUCIS, in fabulous history a Phrygian woman, the wife of Philemon. They received Jupiter and Mercury hospitably, after these gods had been denied hospitality in the whole country while travelling in disguise. A deluge destroyed the remainder of the people, but Philemon and Baucis, with their cottage, were saved. They begged the gods to make their cottage a temple, in which they could officiate as priest and priestess, and that they might die together; which was granted. Philemon and Baucis are, therefore, names often used to indicate faithful and attached married people.

BAUHIN.—1. JOHN, an eminent botanist, born at Basel in 1541, studied medicine under his father, who long stood at the head of his profession there, after his Protestantism had driven him from France. He distinguished himself by his ardour in natural history pursuits, in prosecuting which he travelled over the greater part of the Alps, Italy, and the south of France, preparing materials for a Historia Plantarum, which occupied the larger portion of his life, but was not published till 1650, thirty-seven years after his death. This work, in which he describes 5000 plants, divided into forty classes or books, is in three vols. folio, and is considered the first in which an attempt was made to give a regular form to systematical botany.——2. GASPARD, brother of the foregoing, born at Basel in the year 1560, was at first intended for the Protestant ministry, but having, like his brother, manifested a decided inclination for medicine and botany, was allowed to follow it, and studied first at Basel and then at Padua. After finishing his studies he travelled over many parts of Europe, and in 1580 returned to Basel, bringing with him a reputation which immediately secured him the chair of Greek, and afterwards (in 1589) that of anatomy and botany. His fame rests chiefly on the latter, and more especially on his two works, Pinax Theatri Botanici, Theatrum Botanicum. He died in 1624. The name and merits of the two Bauhins have been happily commemorated by Linnæus, by giving the name of Bauhinia to a genus belonging to the nat. order Leguminosæ, and remarkable for having its leaves generally divided into two twin lobes.

BAUMANN'S CAVERN (in Ger. *Baumannshöhle*), an interesting natural cavern in the Harz, in the principality of Blankenburg, on the left bank of the Bode, about five miles from Blankenburg, in a

limestone mountain, consisting of six principal apartments, besides many smaller ones, everywhere covered with stalactites. The earthy ingredients of these petrifactions are held in solution by the water which penetrates the rock, and deposits a calcareous stone. The name of this cavern is derived from a miner, who entered it in 1672, with the view of finding ore, but lost his way, and wandered about for two days before he could find the entrance.

BAUME, ANTOINE, a distinguished chemist and pharmaceutist, born at Senlis in 1728, obtained the professorship of chemistry in the College of Pharmacy at Paris about 1752, was admitted a member of the Academy of Sciences, chiefly in return for some excellent memorials communicated to that body; wrote Elements of Theoretical and Practical Pharmacy, which went through nine editions in France, and was translated into most European languages, and contributed by his discoveries to numerous important improvements in the arts, particularly in the manufactures of sal-ammoniac, soap, and porcelain, in gilding, and the bleaching of silk. He died in 1804. His name is familiar from the areometer which he invented, and which is still in use.

BAUMGARTEN, ALEXANDER GOTTLIEB, an acute and clear thinker of the school of Wolf, was born in 1714 at Berlin, studied at Halle, and was, for a time, professor extraordinary there. In 1740 he was made professor of philosophy at Frankfort-on-the-Oder, and died there in 1762. He is the founder of æsthetics as a science, and the inventor of this name. He derived the rules of art from the works of art and their effects. Hereby he distinguished himself advantageously from the theorists of his time. (See ÆSTHETICS.) His ideas of this science he first developed in his academical discussion, De Nonnullis ad Poema pertinentibus (Halle, 1735, 4to). George Fr. Meier's Principles of all Liberal Sciences (three vols., Halle, 1748–50) originated from his suggestions. Eight years later, Baumgarten published his Æsthetica (Frankfort-on-the-Oder, 1750–58, two vols.), a work which death prevented him from completing.

BAUR, FERDINAND CHRISTIAN, one of the most celebrated theologians of modern Germany, founder of the 'New Tübingen School of Theology,' was born at Blaubeuren, where his father was pastor, on the 21st of June, 1792. At the University of Tübingen, which he entered in 1809, he devoted five years to theological studies, and in 1817 he became professor in the seminary at Blaubeuren. While holding this position he published his first work, Symbolik und Mythologie, oder die Naturreligion des Alterthums (Symbolism and Mythology, or the Natural Religion of Antiquity; Stuttg. 1824–25), by which his eminent theological abilities were so clearly manifested, that in 1826 he received a call to Tübingen as ordinary professor in the evangelical faculty of that university. This position he continued to occupy till his death, on the 2d of December, 1860. His chief works belong to the two departments of the history of the Christian dogmas and New Testament criticism, in both of which his views have had the most powerful effect upon the theology of the present day. His most important works belonging to the first class are:—Die christl. Gnosis, oder die christl. Religionsphilosophie (The Christian Gnosis, or the Christian Philosophy of Religion; Tüb. 1835); Die christl. Lehre von der Versöhnung (The Christian Doctrine of the Atonement; Tüb. 1838); Die christl. Lehre von der Dreieinigkeit und Menschwerdung Gottes (The Christian Doctrine of the Trinity and the Incarnation; Tüb. 1841–3); Lehrbuch der christl. Dogmengeschichte (Compendium of the History of Christian Dogmas; Stuttg. 1847). To the second class belong Die sog. Pastoralbriefe des Apostels Paulus (The so-called Pastoral Epistles of the Apostle Paul; Stuttg. 1835); Paulus, der Apostel Jesu Christi, Sein Leben und Wirken, seine Briefe und seine Lehre (Paul the Apostle of Jesus Christ, his Life and Labours, his Epistles and his Teaching; Stuttg. 1845); Kritische Untersuchungen über die Kanonischen Evangelien, &c. (Critical Inquiries concerning the Canonic Gospels, their Relation to One Another, their Origin and Character; Tüb. 1847). He has also written the History of Christian Doctrine from the Origin of Christianity down to the End of the Eighteenth Century, which was published in a series of volumes between 1853 and 1863, the last two posthumously.—This Baur is to be distinguished from Gustav A. L. Baur, a German theologian of the school of Schleiermacher, born in 1816, and Bruno Bauer, a biblical critic and philosopher, born in 1809.

BAUSE, JOHANN FRIEDRICH, a distinguished German engraver, born at Halle in 1738, died at Weimar, 1814. He resided chiefly at Leipzig, where he executed many highly esteemed engravings. He was a member of several academies of fine arts.

BAUTZEN, or BUDISSIN, capital of the circle of the same name (pop. in Dec. 1871, 330,133), in the kingdom of Saxony, upon a height defended on the west side by steep rocks, the foot of which is watered by the Spree. Among the 13,165 inhabitants, who are principally Lutherans, there are a great number of Wends, or descendants of the Vandals, who worship in a Lutheran and in a Catholic church, in their own language. The German part of the population, both Catholic and Protestant, worship together in the cathedral: the former are in possession of the third part of it, including the high altar, sufficiently large for the small Catholic congregation; the nave serves the Lutheran community as their parish church, and the mutual spirit of toleration in both parties has, in recent times, prevented trouble from such an arrangement. Bautzen has fine barracks, a gymnasium, a seminary for the training of teachers, manufactures of woollens, fustian, cloth, leather, paper, and machines, and considerable trade in flax, yarn, and wool. It is an old town, and was fortified by Otho I. It contains the castle of Ortenburg, which was formerly the frequent residence of the Bohemian kings. It was taken during the Seven Years' War by the Prussians in 1757, and here also Napoleon defeated the united armies of the Russians and the Prussians on the 21st May, 1813.

BAVARIA [German, *Baiern;* French, *Bavière*], a kingdom of Central Europe, in the south of Germany, composed of two isolated portions of unequal size. The larger portion, comprising about seven-eighths of the monarchy, is included between lat. 47° 19′ and 50° 41′ N., and lon. 8° 53′ and 13° 50′ E.; bounded east by Bohemia and the arch-duchy of Austria, south by Tyrol, Vorarlberg, and Lake Constance, west by Würtemberg, Baden, the grand-duchy of Hesse, and the Prussian province of Hesse-Nassau, north by the states of Ducal Saxony, the principalities of Reuss, and the kingdom of Saxony. The smaller portion, the Pfalz or Palatinate, lies west from the main portion of the kingdom, and separated from it by Würtemberg, Baden, and the grand-duchy of Hesse. It is included between lat. 48° 57′ and 49° 50′ N.; and lon. 7° 6′ and 8° 31′ E.; and is bounded east by the Rhine, which separates it from Baden, south by the German territory of Alsace-Lorraine, west by the Prussian Rhine provinces and a portion of Saxe-Coburg, and north by the grand-duchy of Hesse. Bavaria is estimated to contain an area of 29,657 square miles, and is divided into eight circles (*kreise*), which were formerly named after the rivers

that watered them; but an edict of Nov. 29, 1837, gave the circles new names and new boundaries. The following table shows the new and old names of the circles, with their area and population:—

Circles (Kreise).		Area, sq. m.	Population, 1871.	Chief Towns.	Population, 1871.
Modern Name.	*Ancient Name.*				
1. Oberbaiern (Upper Bavaria)....	Isarkreis (Iser).....	6,614	841,570	Munich	169,478
2. Niederbaiern (Lower Bavaria)..	Unterdonaukreis (Lower Danube)..	4,113	602,005	Passau.....	13,389
3. Pfalz (Palatinate).....	Rheinkreis (Rhine).....	2,226	615,104	Spires	13,241
4. Oberpfalz (Upper Palatinate) and Regensburg (Ratisbon)..	Regenkreis (Regen).....	4,198	497,960	Ratisbon.....	29,224
5. Oberfranken (Upper Franconia).	Obermainkreis (Upper Main).....	2,226	540,963	Baireuth.....	17,837
6. Mittelfranken(Middle Franconia)	Rezatkreis (Rezat).....	2,798	583,417	Anspach.....	12,635
				Nürnberg.....	82,929
7. Unterfranken (Lower Franconia) and Aschaffenburg...	Untermainkreis (Lower Main).....	3,604	586,122	Würzburg.....	40,008
8. Schwaben (Swabia) and Neuburg	Oberdonaukreis (Upper Danube)..	3,858	582,888	Augsburg.....	51,284
At date of census there were 11,364 Bavarian soldiers in France.		29,637	4,861,402		

Mountains.—Bavaria is a hilly rather than a mountainous country. A large portion, more especially south of the Danube, is a plateau country of considerable elevation, and indeed, the whole of the main portion of the kingdom may be described as an upland valley, averaging about 1600 feet above the sea-level, intersected by numerous large streams and ridges of low hills. On all sides it is surrounded by hills of a greater or less altitude, either quite upon the frontier or only at small distances from it. The whole south frontier is formed by a branch of the Noric Alps, offsets from which project far into the south plateau of Bavaria. Besides numerous peaks which this range contains, varying from 4000 to 8000 feet high, the following may be named as being above the latter number:—the Zugspitze, 10,394 feet high; the Watzmann, 9470 feet; the Hochvogel, 8460 feet; the Madeler Gabel, 8650 feet. Passing along the valley of the Inn and across the Danube, we come to the Bohemian frontier, formed by the Böhmerwald Mountains running S.E. to N.W., and lowering down at the valley of the Eger. The highest peaks in this range are the Rachel, 5102 feet, and the Arber, 5185 feet. Crossing the Eger we meet with the Fichtelgebirge, presenting the Schneeberg, 3750 feet high, and the Ochsenkopf, 3633 feet. West from this range, and along the frontier of the Saxon ducal territories and Hesse-Cassel, run hills of moderate elevation, under various names, Frankenwald, Rhöngebirge, &c., no peaks of which attain an elevation of more than 3327 feet. The west mountain boundary of the Bavarian valley is formed north of the Main by the Spessartwald range, and in the kingdom of Würtemberg by the Alb or Alp. The only noteworthy interior ranges are, in the N.W., the Steigerwald; and in the N.E., running in a S.W. direction from the Fichtelgebirge, the Franconian Jura; a low limestone range, containing numerous remarkable stalactitic caves. The Pfalz or Palatinate is traversed by the north extremity of the Vosges, the highest peak in this locality being the Königstuhl, 2162 feet high.

Lakes.—The lakes of Bavaria are neither very numerous nor of very great extent, though many of them present exceedingly picturesque scenery. The larger are all situated on the upper part of the south plateau; the smaller within the range of the Noric Alps. The most remarkable of the former are, Lake Ammer, about 10 miles long by 2½ broad, 1736 feet above the sea; Lake Würm or Starnberg, about 12 miles long by 3 broad, 1899 feet; and Lake Chiem, 9 miles long by 9 to 4 broad, 1651 feet above the sea. Of the smaller, the more remarkable are Lake Tegner, about 3 miles long, 2586 feet; Lake Walchen, 2597; and various others upwards of 2000 feet above the sea-level. Most of the lakes are well supplied with fish.

Rivers.—Bavaria belongs wholly to the basins of the Danube and the Rhine, with exception of a very small portion in the N.E. corner, which through the Eger appertains to the basin of the Elbe. The river Danube intersects the main portion of the kingdom west to east nearly in the centre, and before it enters the Austrian dominions at Passau, where it is still 925 feet above the sea, it receives on its right bank the rivers Iller, Lech, and Isar, which have their sources in the Noric Alps, besides numerous smaller streams; and on its left bank, the Wörnitz, Altmühl, Nab, and Regen, besides other lesser streams. The Main traverses nearly the whole of the north part of this portion of the kingdom from east to west, and is navigable for steam-vessels from Bamberg to the Rhine. Its principal affluents are the Regnitz and the Saale. In the Palatinate there are no streams of any importance, the Rhine being merely a boundary river.

Climate.—If we except the valley of the Rhine, and the valley of the Main in Lower Franconia, Bavaria, even including the Palatinate, in comparison with other German states, is a cold country. The average temperature of the year is about 47° Fahrenheit, the same as the east coast of Scotland. Winter, 30°; spring, 47°; summer, 63°; and autumn, 47°.

Soil and Vegetation, &c.—Bavaria is one of the most favoured countries in Germany, in respect of the fruitfulness of its soil, due no doubt in a considerable degree to the undulating nature of the country, to the numerous streams by which it is watered, and to being nearly wholly composed of Jura limestone. In the plains and valleys the soil is capable of producing all kinds of crops, but not until lately were the natural advantages of the country turned to good account. Ignorance and idleness opposed a barrier to improvement, which it took the utmost efforts of an enlightened government, aided by the general spread of education, to remove. At length a spirit of agricultural enterprise pervades the kingdom, improved methods of cultivation have been introduced, and large tracts of waste land have been reclaimed and brought under the plough. The principal crops are wheat, rye, barley, and oats; but in some districts rice, spelt, maize, and buckwheat are also raised. To these productions of the soil may be added potatoes (the cultivation of which is yearly increasing), tobacco, and fruit, of which large quantities are grown in the valleys of the Main and the Rhine. In the circles of Mittelfranken and Schwaben-Neuburg, the hop plant is cultivated to a considerable extent, the quantity varying from 30,000 to 40,000 cwts. per annum; and the vine in the circles of Pfalz and Unterfranken. The latter produces the Franconian wines; the best wines of the former are produced near Deidesheim and Wachenheim.

The celebrated Steinwein and Leistenwein are the produce of the south slope of the Marienberg, near the town of Würzburg. The forests of Bavaria, composed chiefly of fir and pine trees, cover nearly a third of its entire surface, and yield a large revenue to the state; much timber being annually exported, together with potashes, tar, turpentine, and other products peculiar to these wooded regions.—The principal mineral products are salt, coal, and iron. The first is a royal monopoly, and produces a considerable revenue; the latter are not wrought to nearly the extent they might be, though a considerable number of iron-works and coal-mines are in operation. Black-lead is found in several places, and pretty largely exported, especially to America, where it is used for making crucibles. Porcelain clay of the finest quality likewise abounds in some localities, the best being obtained in the district of Wunsiedel in the Upper Main.—In the rearing of cattle and sheep the Bavarians are still far behind. Notwithstanding the extent and excellence of their pastures, the stock, generally, is of inferior quality, and inadequate to the home consumption. Improvement in these respects, however, is now in progress, through the instrumentality of agricultural and veterinary schools, which have now been established some time, and which distribute prizes to encourage the breeding of stock. Swine are reared in great numbers in all parts of the country, and poultry and wild fowl are abundant. The wolves and bears, with which the forests of Bavaria were at one time infested, are nearly extinct.—The manufactures of Bavaria are singly very unimportant, being mostly on a small scale, and conducted by individuals of limited capital. The principal articles manufactured are coarse linens, woollens, cottons, leather, paper, glass, earthen and iron ware, jewelry, &c., but the supply of the first three articles is inadequate to the home consumption. Of leather, paper, glass, and iron-ware, pretty large quantities are exported. The optical and mathematical instruments made at Munich are the best on the Continent, and are prized accordingly. But the most important branch of manufacture in Bavaria is the brewing of beer—the universal and favourite beverage of the country. There are upwards of 5000 brewing establishments in the kingdom, which have been calculated to supply on an average about twenty gallons a year to every individual of the population. The beer is neither so strong nor so sweet as Scotch ale; but is of more delicate flavour, and forms a pleasant and wholesome beverage. It is not only consumed in immense quantities in the country, but is sent to all parts of Germany, and even as far as America and India. A large portion of the industrial population maintain themselves by weaving linen, and by the manufacture of articles in wood (some of which are of beautiful workmanship), and by the felling and hewing of timber. Notwithstanding its favourable geographical position, and other natural advantages, the trade of Bavaria is very limited. The total value of goods exported annually does not exceed £1,500,000. Principal exports—corn, timber, wine, cattle, sheep, hogs, butter, salt, iron, leather, glass, hops, fruit, beer, &c. Imports—sugar, coffee, cotton, rice, tobacco, drugs, copper, oil, spices, dye-stuffs, silk and silk goods, lead, &c.—From its position Bavaria enjoys a considerable portion of transit trade, much facilitated by the good roads that traverse the country in all directions. The means of communication are now very complete. The Danube, the Rhine, the Main, the Regnitz, &c., afford ample scope for inland navigation, besides the König Ludwig Canal, which connects the Main at Bamberg with the Altmühl a short distance above its embouchure in the Danube, thus establishing direct water communication through the Rhine between the German Ocean and the Black Sea. The railway system, which is now managed as a part of the imperial system of railways according to the constitution of the German Empire, has been carried out on an extensive scale. The lines are partly state property, partly private. The total length in actual operation is already above 2000 miles; but in 1869 a law was passed in the Bavarian chambers, providing for the construction of twenty-two new lines, at a cost of 92,000,000 florins (£7,650,000), which, when completed, will add about 1200 miles to the length of railways already constructed; and at the same time the Ostbahn received permission to extend its line, at a cost of 47,000,000 florins (nearly £4,000,000).

Education and Art.—The department of education is under the superintendence of the 'Superior Board of Education and Ecclesiastical Affairs.' A complete system of inspection is established throughout the country; the reports of the inspectors including not only the number and proficiency of the scholars, but also the conduct of the teachers, the state of the buildings, and the nature and extent of the funds available. It is necessary in Bavaria, before admission can be obtained into any higher school, to have passed a satisfactory examination in the lower school. Not only must all candidates for offices under the state pass examinations, but examinations are held of apprentices in trade who wish to become masters, and even of officers in the army on promotion. There are over 8000 schools in Bavaria, attended by more than 600,000 pupils. Attendance on school is compulsory up to fourteen years of age. There are three universities in Bavaria—two of which (Munich and Würzburg) are Roman Catholic, and one (Erlangen) Protestant. The University of Munich is attended by about 1200 students, and in 1870 had 118 professors and instructors; that of Würzburg had 66 professors and instructors, and about 600 students; and that of Erlangen, 50 professors and instructors, and under 400 students. There are also several lycea, a number of gymnasia, numerous Latin, normal, and polytechnic schools, besides academies of arts and sciences, fine arts, horticulture, &c. The capital, Munich, contains a library of 600,000 volumes, including 16,000 MSS.; several scientific and literary institutions, academies, and national societies, and extensive collections of works of art.—Bavaria enjoys the honour of having originated a school of painting of a high order of merit, known as the Nürnberg school, founded about the middle of the sixteenth century by Albert Dürer, a native of that town, whose works are little, if at all, inferior to those of his great Italian contemporaries. Hans Holbein, who excelled Dürer in portrait, though far behind him in historical painting, is claimed by Bavaria, but neither the precise locality nor the date of his birth is known with certainty—Augsburg, Basel, and Grünstadt being severally named as the one, and the dates 1495 and 1498 as the other. To these celebrated names have to be added those of the eminent sculptors Kraft and Vischer, both also Bavarians; the former born about 1435, and the latter about the middle of the same century. The master-piece of the latter distinguished artist is the bronze shrine of St. Sebaldus in Nürnberg, esteemed a marvel of art for beauty of design and delicacy of workmanship. The most celebrated of Kraft's works is the remarkable tabernacle in stone, affixed against one of the columns of the choir of the church of St. Lawrence, also in Nürnberg. The restoration of Bavarian pre-eminency in modern times, in connection with the fine arts, is, in a great measure, if not entirely, owing to Louis I., whose love of art

and liberal patronage have rendered the capital one of the most celebrated seats of the fine arts in Europe.

Religion.—There is no predominant church in Bavaria, but the prevailing religion is the Roman Catholic, professed by 3,441,029 in 1867. The principal portion of the remainder are Lutherans (1,325,446), Reformed and Jews (49,840). Although, however, Catholicism is the religion of the state, all others are free; and all citizens, whatever their creed, are equally admissible to the same public functions and employments, and possess the same civil and political rights. The articles of the concordat concluded with the pope are subordinate in their application to the fundamental law of the state. By an ordinance of Louis I. females are prohibited from pronouncing any monastic vow until after having passed their thirty-third year. The dioceses of Bavaria comprise two archbishoprics, Munich and Bamberg; and six bishoprics, Augsburg, Ratisbon, Eichstädt, Passau, Würzburg, and Spires. The salaries are paid by government. In Bavaria marriage between individuals having no capital cannot take place without the consent of the principal persons appointed to superintend the poor institutions, who, if they grant such liberty where there are no means of supporting the children that may spring from such marriage, render themselves liable for their maintenance. The law is apparently intended to prevent improvident marriages, for which it seems certainly better adapted than for the promotion of morality.

People.—In personal appearance the Bavarians are stout and vigorous, well adapted to bear the fatigues of war, and are in general considered as good soldiers. They are indolent, addicted to drinking and to immoral practices, but are brave, patriotic, and faithful to their word. Their manners and customs towards the close of the last century were described as coarse in the extreme, and strongly marked with the superstitious bigotry of their religious creed; but, since the more general diffusion of knowledge, a great change for the better has taken place. The peasantry are clad in long loose snuff-coloured coats, lined or edged with pink, and studded in front with clusters of silver or white metal buttons, thrown open to display a smart waistcoat of various and brilliant colours; their hats are ornamented with artificial flowers. Many of the Bavarian females are handsome, lively, and graceful. They dress smartly, and display much taste in their attire. Some of them wear black silk handkerchiefs tied tightly round their heads, decorated with flowers or ribbons, some caps of silver or gold tissue, and all having their hair neatly braided. German is the language chiefly spoken by the Bavarians; but they have never been conspicuous for the cultivation of their native tongue.

Constitution.—Bavaria was formerly a member of the Germanic Confederation, and now forms part of the German Empire. The executive is in the hands of the king. The legislature consists of two chambers—one of senators, and one of deputies; the former composed of princes of the royal family, the great officers of the state, the two archbishops, the heads of certain noble families, a bishop named by the king, the president of the Protestant General Consistory, and any other members whom the king may create hereditary peers; the latter, of members chosen, one to every 7000 families or 35,000 persons. The qualifications are, that the candidate shall have completed his 30th year, that he shall be a free and independent citizen, that he shall be a member of the Romish or Reformed Church, and pay taxes on property of the value of £765 at the least. The members are chosen every six years, unless dissolved by the king, and are generally convened once a year, but are bound to assemble at least once every three years. Each of the eight circles or provinces has a provincial government, consisting of two boards, one for the management of the police, schools, &c., and the other for the management of financial affairs. The estimated revenue for the financial year 1872–3 was 110,188,260 florins (£9,182,355), and the public debt at the end of 1869 was 425,175,254 florins (£35,431,271). The army is raised by conscription —every man being liable to serve from the 1st of Jan. of the year in which he completes his 20th year—and it forms an independent part of the army of the German Empire. In time of peace it is under the command of the King of Bavaria, but in time of war it is placed under that of the Emperor of Germany, as commander-in-chief of the whole German army. The period of service is three years in the active force, four in the reserve, and five in the landwehr; and no Bavarian can settle or marry, or accept of any definite appointment, until he has fulfilled his military liabilities. On a peace footing the Bavarian army consists in all of 32,820 men, and on a war footing of 112,016 men.

History.—The Bavarians take their name from the Boii, a Celtic tribe who inhabited the districts which, when conquered by the Romans, became the Roman provinces of Vindelicia and Noricum. After the fall of the Western Empire this territory was overrun by various Germanic tribes, who formed themselves into a confederation, like that of the Franks and Marcomanni, and called themselves Boiarii. The confederacy of the Boiarii was made tributary first to the Ostrogoths, and then to the Franks. Finally the sovereignty over them was assumed by Charlemagne, and on the death of that monarch the kings of the Franks and Germans governed it by their lieutenants, who bore the title of margrave, afterwards converted into that of duke, and latterly (1623) into that of elector. In 1070 Bavaria passed into the possession of the family of the Guelphs, and in 1180 it was transferred by imperial grant to Otho, count of Wittelsbach. On the extinction of the direct line of that family in 1777, the elector palatine, Charles Theodore, added the Palatinate and the duchies of Juliers and Berg to the Bavarian dominions. In 1799 the duke Maximilian Joseph of Deux-Ponts came into possession of all the Bavarian territories. The peace of Luneville (Feb. 9, 1801) essentially affected Bavaria. Whilst it lost all its possessions on the left bank of the Rhine, and also the lands of the Palatinate on the right bank, it obtained, on the other hand, by an imperial edict, an indemnification, by which it gained, in addition to the amount lost, a surplus of 2109 square miles, and 216,000 inhabitants.

In 1805 Bavaria was raised, by the treaty of Presburg, to the rank of a kingdom, with some further accessions of territory, all of which were confirmed by the treaties of 1814 and 1815, by which also a great part of the lands of the Palatinate was restored. In 1848 the discreditable conduct of the King of Bavaria, in maintaining an open *liaison* with a wandering actress who had assumed the name of Lola Montez, had thoroughly alienated the hearts of his subjects, and quickened that desire of political change which had previously existed. In this spirit the people, early in March, 1848, demanded the immediate convocation of the chambers, the liberty of the press, that judicial trials should be public, that an electoral reform should be granted, and that the army should take an oath to observe the constitution. The king having refused, tumults occurred, and King Louis announced his resignation

of the sceptre to his son, Maximilian II., under whom the reforms and modifications of the constitution were carried out. Maximilian died in 1864, and was succeeded by Louis II. In the war of 1866 Bavaria sided with Austria, in consequence of which it was obliged, by the treaty of Aug. 22 in the same year, to cede a small portion of its territory to Prussia, and to pay a war indemnity of 30,000,000 florins (£2,500,000). Soon after Bavaria entered into an alliance with Prussia, and in 1867 joined the Zollverein under Prussian regulations. In the Franco-German war of 1870–71 the Bavarians took a prominent part, and it was at the request of the King of Bavaria, on behalf of all the other princes and the senates of the free cities of Germany, that the King of Prussia agreed to accept the title of Emperor of Germany. Since Jan. 1871 Bavaria has been a part of the German Empire, and is represented in the Bundesrath by six, and in the Reichstag by forty-eight members.

BAVIUS, MARCUS, and MÆVIUS, still notorious as two miserable poets and presumptuous critics, satirized by Virgil.

BAXTER, ANDREW, a Scotch philosopher and metaphysician. He was a native of Aberdeen, and was educated at King's College in that city, after which he was employed as a private tutor. About 1730 he published an Inquiry into the Nature of the Human Soul; wherein the Immateriality of the Soul is Evinced from the Principles of Reason and Philosophy. In 1741 he went abroad with one of his pupils, and remained for some years at Utrecht, where he contracted an acquaintance with some of the Dutch literati. He returned to Scotland in 1747, and resided at Whittingham, in East Lothian, where he died in 1750, aged sixty-three. He was the author of a Latin treatise entitled Matho sive Cosmotheoria, Puerilis Dialogus, which he afterwards translated into English, and published in two vols. 12mo.

BAXTER, RICHARD, the most eminent of the English nonconforming divines of the seventeenth century, was born in the village of Rowton, in Shropshire, in 1615. The example of his father, who was accused of Puritanism, gave him a serious turn very early in life. After receiving his education he was sent to London, under the patronage of Sir Henry Herbert, master of the revels; but he soon returned into the country with a view to study divinity; and, in 1638, received ordination in the Church of England. The imposition of the oath of universal approbation of the doctrine and discipline of the Church of England, usually termed the *et cætera oath*, detached him and many others from the Establishment. When the civil war broke out he sided with the Parliament, and, after the battle of Naseby, accepted the appointment of chaplain to Colonel Whalley's regiment. He is said to have been, the whole of this time, a friend to the Establishment, according to his own notions, and to have repressed sectaries as much as he was able. In 1647 he retired, in consequence of ill health, from his military chaplainship, and when he recovered opposed the measures of those in power, and preached urgently against the Covenant. He even endeavoured to persuade the soldiery not to encounter the Scottish troops who came into the kingdom with Charles II., and hesitated not to express an open dislike to the usurpation of Cromwell, whom he told, in a conference very characteristic of both parties, that the people of England deemed the ancient monarchy a blessing. The fact is, that Baxter, with many more zealous religious partisans, held civil liberty to be of secondary consequence to what he esteemed true religion, and appears, from the tenor of a sermon which he preached before Cromwell, to have deemed the toleration of separatists and sectaries the grand evil of his government. After the Restoration he was made one of the king's chaplains, and a commissioner of the Savoy Conference, to draw up the reformed liturgy. The active persecution of the Nonconformists soon followed; and, upon the passing of the act against conventicles, he retired, and preached more or less openly, as the act was more or less rigidly enforced. After the accession of James II., in 1685, he was arrested for some passages in his Commentary on the New Testament supposed hostile to Episcopacy, and was tried for sedition. The violence of Jeffreys, who would neither hear the accused nor his counsel, produced a verdict of guilty on the most frivolous grounds. He was sentenced to two years' imprisonment, and a heavy penalty, which, after a short confinement, the king remitted, probably with some degree of compunction for the manner of its infliction. Henceforward Baxter lived in a retired manner till his death in 1691. His wife cheerfully shared all his sufferings on the score of conscience, both in and out of prison. The character of Baxter was formed by his age; his failing was subtle and controversial theology; his excellence, practical piety. In divinity he sought to establish a resting-place between strict Calvinism and high-church Arminianism, by the admission of election and the rejection of reprobation. Christ, he considered, died for some especially, and for all generally; that is to say, all possess the means of salvation. A body called *Baxterians* long acknowledged these distinctions; and the Nonconformist clergy, after the Revolution, were divided between this body, the pure Calvinists, and the high-church passive-obedient Arminians. Baxter was a voluminous writer: his Saints' Everlasting Rest, and the Call to the Unconverted, have been extraordinarily popular.

BAYADERE, in the East Indies, young girls, from ten to seventeen years of age, who are instructed in dancing, singing, and acting little plays. They are under the care of matrons, who are experienced in all female arts, and particularly in that of pleasing. These select from the lowest classes of the people the most beautiful girls, of seven or eight years of age, secure them by inoculation from the disfiguring consequences of the small-pox, and instruct them in all the arts of their profession, the object of which is to amuse the rich and minister to their passions. Their presence is considered necessary even at the smallest entertainments, though they are known to be mere prostitutes. After their seventeenth year, when their first charms have faded, they retire to a pagoda, under the protection of the Brahmins, who scruple not to pocket the gains of their prostitution. This word is supposed to be a corruption of the Portuguese word *bailadeira*.

BAYAMO, or ST. SALVADOR, a town of Cuba, on a river which forms a port on the S.E. coast; 520 miles E.S.E. Havannah; lon. 76° 55′ W.; lat. 20° 46′ N.; pop. estimated at 12,000. The town is about 20 miles distant from the port. It gives name to the channel between the mainland of Cuba and the islands called the Queen's Gardens.

BAYARD, or more properly BAYART, PIERRE DU TERRAIL, CHEVALIER DE, called the *knight without fear and without reproach*, born in 1476, in the castle of Bayard, near Grenoble, was one of the most spotless characters of the middle ages. He was simple and modest; a true friend and tender lover; pious, humane, and magnanimous. The family of Terrail, to which he belonged, was one of the most ancient in Dauphiné, and was celebrated for nobility and valour. Young Bayard, educated under the eyes of

his uncle George du Terrail, bishop of Grenoble, early imbibed in the school of this worthy prelate the virtues which distinguished him afterwards. At the age of thirteen he was received among the pages of the Duke of Savoy, the ally of France. Charles VIII., who saw him at Lyons, in the suite of this prince, was struck with the dexterity with which the youth managed his horse: he begged him of the duke, and committed him to the care of Paul of Luxemburg, count de Ligny. The tournaments were his first field of glory.

At the age of eighteen he accompanied Charles VIII. to Italy, and distinguished himself greatly in the battle at Verona, where he took a standard. At the beginning of the reign of Louis XII., in a battle near Milan, he pursued the fugitives with such eagerness, that he entered the city with them, and was taken prisoner. Ludovico Sforza returned him his arms and his horse, and dismissed him without ransom. Whilst the French were in Apulia, Bayard defeated a Spanish corps, and made their leader, Don Alonzo de Sotomayor, prisoner. He treated him with generosity. Sotomayor, however, not only violated his parole by flight, but calumniated Bayard, who, according to the custom of that time, challenged him, and killed him. Afterwards, like Horatius Cocles, he defended a bridge over the Garigliano singly against the Spaniards, and saved the French army by checking the advance of the victorious enemy. For this exploit he received as a coat of arms a porcupine, with the motto *Vires agminis unus habet.* He distinguished himself equally against the Genoese and the Venetians. When Julius II. declared himself against France, Bayard went to the assistance of the Duke of Ferrara. He did not succeed in his plan of taking the pope prisoner; but he refused with indignation an offer made to betray him. Being severely wounded at the assault of Brescia, he was carried into the house of a nobleman who had fled and left his wife and two daughters exposed to the insolence of the soldiers. Bayard protected the family, refused the reward of 2500 ducats which they offered to him, and returned, as soon as he was cured, into the camp of Gaston de Foix, before Ravenna. In an engagement which shortly after ensued he took two standards from the Spaniards, and pursued the fugitives. Gaston, the hope of France, perished through his neglect of the advice of Bayard. In the retreat from Pavia Bayard was again wounded. He was carried to Grenoble; his life was in danger. 'I grieve not for death,' he said, 'but to die on my bed, like a woman.'

In the war commenced by Ferdinand the Catholic he displayed beyond the Pyrenees the same talents, the same heroism, which had distinguished him beyond the Alps. The fatal reverses which embittered the last years of Louis XII. only added a brighter splendour to the personal glory of Bayard. Henry VIII. of England, in alliance with Ferdinand and Maximilian, threatened Picardy in 1513, and besieged Terouane. The French army disgracefully took to flight. Bayard, with his accustomed intrepidity, made an ineffectual resistance to the enemy: overpowered by superior numbers, his troop was on the point of laying down their arms, when Bayard, perceiving an English officer at some distance from him, immediately galloped towards him, presented his sword to his breast, and cried, 'Yield, or die!' The Englishman surrendered his sword: Bayard immediately gave him his own, saying, 'I am Bayard, and your captive, as you are mine.' The boldness and ingenuity of this action pleased the emperor and the King of England, who decided that Bayard needed no ransom, and that both captives were released from their parole.

When Francis I. ascended the throne, he sent Bayard into Dauphiné to open for his army a passage over the Alps, and through Piedmont. Prosper Colonna lay in wait for him on his march, expecting to surprise him, but Bayard made him prisoner. This brilliant exploit was the prelude to the battle of Marignano, in which Bayard, at the side of the king, performed wonders of bravery, and decided the victory. After this glorious day Francis was knighted with the sword of Bayard. When Charles V. invaded Champagne with a large army, and threatened to penetrate into the heart of France, Bayard defended the weakly-fortified town of Mézières against every assault, until the dissensions of the hostile leaders compelled them to retreat. Bayard was saluted in Paris as the saviour of his country: the king bestowed on him the order of St. Michael, and a company of 100 men, which he was to command in his own name—an honour which till then had only been conferred on princes of the blood. Soon afterwards Genoa revolted from France: Bayard's presence reduced it to obedience. But after the surrender of Lodi fortune changed, and the French troops were expelled from their conquests. Bonnivet was obliged to retreat through the valley of Aosta; his rear was beaten, and himself severely wounded, when the safety of the army was committed to Bayard. It was necessary to pass the Sesia in the presence of a superior enemy, and Bayard, always the last in retreat, vigorously attacked the Spaniards, when a stone from a blunderbuss struck his right side, and shattered his backbone. The hero fell, exclaiming, 'Jesus, my God, I am a dead man!' They hastened towards him. 'Place me under yon tree,' he said, 'that I may see the enemy.' For want of a crucifix he kissed the cross of his sword, confessed to his squire, consoled his servants and his friends, bade farewell to his king and his country, and died April 30, 1524, surrounded by friends and enemies, who all shed tears of admiration and grief. His body, which remained in the hands of his enemies, was embalmed by them, given to the French, and interred in a church of the Minorites, near Grenoble. His monument consists of a simple bust, with a Latin inscription. See Hist. de P. Terrail, dit le Chevalier Bayard, sans Peur et sans Reproche, by Gayard de Berville (new edition, Paris, 1824).

BAYAZID. See BAJAZET.

BAYAZID, or BAYEZEED, a town, Turkey in Asia, pashalic of, and 140 miles S.E. from Erzeroom; S.W. of Mount Ararat, from the base of which it is separated by a lava-covered plain 10 miles in width. It is situated on the declivity of a rugged eminence, the summit of which is fortified, and surrounded by a wall and ramparts. The town is in a ruinous state; most of the houses are small and ill built, and the streets are in an extremely filthy condition. Besides the extensive palace of the pasha, the town contains two Christian churches, three mosques, and the famous monastery of Kara-Keleesch, celebrated for its beautiful architecture and antiquity. The inhabitants consist chiefly of Kurds and Armenians. The former amount only to 300 or 400 families; the latter to not more than 190 families. Kurdish is the common language of the place. Some trade is carried on with Georgia and Persia, on the frontiers of which the town is situated. Total pop. 5000.

BAYER, JOHN, born at Rhain, in Bavaria, in 1572, practised as an advocate at Augsburg, but devoted his leisure to astronomy, and occupies an important place in its history from having published charts of the stars, in which they are, for the first time, distinguished by letters. His work entitled Uranometria was first published in 1603. In a

second edition, published in 1627, he changed the name to Cœlum Stellatum Christianum, because he had withdrawn the heathen names of the constellations, and supplied their names by others taken from the Bible, taking those of the northern constellations from the New, and those of the southern constellations from the Old Testament, and giving the names of the twelve apostles to the signs of the zodiac. His letters were adopted by Flamsteed and others, and are now universally used, but the heathen names have kept their ground.

BAYEUX, an ancient town, France, department Calvados, 16 miles N.W. of Caen, with 9138 inhabitants. It consists of antique houses of singular appearance, and possesses a beautiful cathedral with a tower 240 feet high, and a townhouse, in which one of the most interesting relics of the middle ages is preserved. (See BAYEUX TAPESTRY.) Bayeux has manufactures of lace, serge, calico, table-linen, and porcelain, and a considerable trade in horses, cattle, fish, poultry, and dairy produce.

BAYEUX TAPESTRY, so called because it was originally found in the cathedral of Bayeux, in the hôtel de ville of which town it is still preserved. The fact that such a tapestry existed was brought to light by M. Lancelot, who communicated a description of an illuminated drawing of a portion of it to the Academy of Inscriptions and Belles-lettres in 1724. This led to the discovery of the tapestry itself in 1728, whereupon various speculations arose as to its date, its origin, and its purport. According to tradition it is a contemporary representation of the invasion and conquest of England by the Normans, and the discussions upon it have proved that tradition is right. It is thus not only valuable as a relic of the art of the middle ages, but it has also an historical value, inasmuch as it supplies several details of the great event which it portrays which are not found in the chroniclers, and also gives us an exact picture of Norman costumes and manners. It is supposed to have been worked by the needle of Matilda, queen of William the Conqueror, assisted by her attendants, and to have been presented by Odo, bishop of Bayeux, the half-brother of William, to the church in which it was found. Whether this is so or not, it is regarded as certain that the tapestry is not later than the eleventh century. During the French revolution the tapestry was in great danger of being destroyed. In 1803 it was removed to Paris by order of Napoleon, and when he was meditating the invasion of Britain he caused it to be carried from town to town and exhibited between the acts in the theatres. It was brought back to Bayeux in 1804, when it was placed in the hôtel de ville, instead of the cathedral, its former resting-place. The length of the tapestry is 214 feet, and its height 20 inches. It is in an excellent state of preservation. An engraving of it was made by Stothard for the London Society of Antiquaries in 1816.

BAY ISLANDS, COLONY OF, an island group, Bay of Honduras, off N. coast of state of Honduras, including the islands of Roatan, Bonacca, Utille, Barbarate, and Helene. It was incorporated as a British colony in 1832, and was ceded to Honduras in 1856. Pop. about 500.

BAYLE, PIERRE, author of the Historical and Critical Dictionary, was born at Carlat, in the county of Foix (Languedoc), in 1647, and received his first instruction from his father, a Calvinistic preacher. He gave early proofs of an astonishing memory and of a singular vivacity of mind. At the age of nineteen years he entered the College of Puy-Laurens, to finish his studies. The ardour with which he devoted himself to them weakened his constitution. All books were eagerly devoured by him; his taste for logic led him particularly to study religious controversies, but Amyot's Plutarch and Montaigne were his favourite works. The latter encouraged, without doubt, his inclination to scepticism; perhaps both contributed to give to his style that vivacity, that boldness of expression, and antique colouring, so observable in it. In Toulouse he studied philosophy with the Jesuits. The arguments of his professors, and still more his friendly discussions with a Catholic priest who dwelt near him, confirmed his doubts of the orthodoxy of Protestantism, so that he resolved to change his religion. His conversion was a triumph to the Catholics. His family, however, tried all means to regain him, and after seventeen months he returned to his old faith. In order to escape from the punishment of perpetual excommunication which the Catholic Church then pronounced against apostates, he went to Geneva, and thence to Copet, where Count Dohna intrusted him with the education of his sons, and where he studied the philosophy of Des Cartes. But after some years he returned to France, and settled in Rouen, where he was employed in teaching. From thence he went to Paris, where the society of learned men indemnified him for the fatigues of an occupation to which he was obliged to submit for the third time.

In 1675 he obtained the philosophical chair at Sedan, where he taught with distinction until the suppression of this academy in 1681. He was afterwards invited to discharge the same duties at Rotterdam. The appearance of a comet, in 1680, which occasioned an almost universal alarm, induced him to publish, in 1682, his Pensées Diverses sur la Comète, a work full of learning, in which he discussed various subjects of metaphysics, morals, theology, history, and politics. It was followed by his Critique Générale de l'Histoire du Calvinisme de Maimbourg. This work, received with equal approbation by the Catholics and Protestants, and esteemed by Maimbourg himself, excited the jealousy of his colleague, the theologian Jurieu, whose Refutation du P. Maimbourg had not succeeded, and involved Bayle in many disputes. He afterwards undertook a periodical work, Nouvelles de la République des Lettres, in 1684. A letter from Rome, published in this work, excited the displeasure of the queen Christina of Sweden, who caused two violent letters to be sent to him. Bayle apologized, and his excuses so perfectly satisfied the queen, that from that time she kept up a literary correspondence with him.

The death of his father and of his two brothers, together with the religious persecutions in France, induced him to undertake his Commentaire Philosophique sur ces Paroles de l'Evangile; Contrains-les d'Entrer; which, in regard to style and tone, is not worthy of him. Bayle himself was unwilling to acknowledge it; but Jurieu, who probably recognized its author by the zeal with which toleration is defended in this work, attacked it with violence. His hatred only waited for a pretence to break out against Bayle; he found it in the Avis aux Refugiés, a work in which the Protestants are treated with little ceremony. Jurieu not only accused Bayle of being the author of this work (which certainly is not his), but also of being the soul of a party devoted to France, in opposition to the Protestants and allied powers. Bayle repelled these charges in two publications; but the calumny prevailed. In 1693 the magistrates of Rotterdam removed him from his office, and forbade him to give private instruction.

He now devoted all his attention to the composition of his Dictionnaire Historique et Critique, which he first published in 1696, in two vols. fol. This was the first work which appeared under his name. Jurieu opposed him anew, and caused the consistory, in

which he had the greatest influence, to make a severe attack upon him. Bayle promised to remove everything which the consistory deemed offensive; but finding the public had other views, and preferring rather the satisfaction of his readers than that of his judges, he left the work, with the exception of a few trifles, unaltered. He found two new enemies in Jacquelot and Le Clerc, who both attacked his religion: others persecuted him as the enemy of his sect and his new country. These contests increased his bodily infirmities. His lungs became inflamed; but he was unwilling to use any medical applications against a disorder which he considered as hereditary and incurable. He died, so to speak, with the pen in his hand, in 1706, at the age of fifty-nine years.

'Bayle,' says Voltaire, 'is the first of logicians and sceptics. His greatest enemies must confess that there is not a line in his works which contains an open aspersion of Christianity; but his warmest apologists must acknowledge, that there is not a page in his controversial writings which does not lead the reader to doubt, and often to scepticism.' He compares himself to Homer's cloud-compelling Jupiter. 'My talent,' he says, 'consists in raising doubts; but they are only doubts.' The confidence of most theologians induced him to undertake to prove that several points are not so certain and so evident as they imagined. But he gradually passed these limits; his penetration caused him to doubt even the most universally acknowledged facts. Yet he never attacked the great principles of morality. Though an admirable logician, he was so little acquainted with physics, that even the discoveries of Newton were unknown to him. His style is natural and clear, but often prolix, careless, and incorrect. He himself calls his Dictionnaire 'une compilation informe des passages cousus à la queue les uns des autres.' Without assenting implicitly to this modest judgment, we must confess that the articles, in themselves, are of little value, and that they serve only as a pretext for the notes, in which the author displays, at the same time, his learning and the power of his logic. The character of Bayle was gentle, amiable, disinterested, highly modest, and peaceable: he devoted himself entirely to literature. The most esteemed edition of his Dictionnaire Historique is that of 1740, in four vols. fol. (an edition was also printed at Bâle the same year). At the Hague appeared the Œuvres Diverses de P. Bayle (also four vols. fol., 1727–31). An edition of his Dict. Histor., in sixteen vols., printed with great typographical beauty, was published, in 1820–24, by Desoer, in Paris: it contains notes, and the life of the author. In the Disc. Prelimin., the editor, Beuchot, reviews the eleven former editions. Gottsched has translated the Dict. into German (Leipzig, 1741–44, four vols. fol.) An English translation, with considerable additions, by Th. Birch, Lockman, and others, was published 1734–41, ten vols. fol.

BAY OF ISLANDS, a large and commodious harbour, N.E. coast island of New Ulster, New Zealand. It is named from the numerous islands which stud it, is of easy access, and has no hidden dangers.

BAYONET. This is the name of the iron blade, formed like a dagger, and placed upon the muzzle of a musket, which is thus transformed into a thrusting weapon. It was probably invented about 1640, in Bayonne, and was used in the Netherlands in 1647, but was not universally introduced until after the pike was wholly laid aside, in the beginning of the eighteenth century. About 1690 the bayonet began to be fastened by means of a socket to the outside of the barrel, instead of being inserted as formerly in the inside. Since the general war in Europe some officers have adopted the idea of former military writers (for instance Guibert), of increasing the efficiency of the bayonet by a more regular exercise of the infantry in its use. A Saxon captain, Von Selmnitz, has the merit of having first developed this idea in a systematic treatise. (See The Art of Fighting with the Bayonet, by E. Von Selmnitz, Dresden, 1825, with copperplates.) As cavalry are often counted by horses, infantry are sometimes counted by bayonets.—A variety of the bayonet, called the sword-bayonet, first used by the French Chasseurs de Vincennes and Zouaves, is now pretty widely used in European armies, especially for the short rifles of the light infantry, the carbines of the artillery, &c. It is a compound of the sword and the bayonet, as its name indicates, having a curved blade like that of a sword, but with only one edge, and being capable of being fastened to the muzzle of the gun like the bayonet. It may thus serve both as a side-arm and as a weapon for thrusting, although for the latter purpose it is by no means so effective as the ordinary bayonet.

BAYONNE, a well-built, rich, commercial city, the largest in the French department of the Basses-Pyrénées, formerly capital of the district Labour, in Gascony (lon. 1° 24′ W.; lat. 43° 29′ N.), at the confluence of the Nive and the Adour, about 2 miles from the Bay of Biscay. It has 25,600 inhabitants, half of whom live in the suburbs. The Nive and the Adour (the former of which is navigable about 30, and the latter 70 miles) form a harbour capable of admitting men-of-war of considerable size, but it has a difficult access. These two rivers serve to convey timber, tar, and iron from the Pyrenees to Bayonne. A citadel, built by Vauban, on the summit of an eminence in the suburb, commands the harbour and the city. The Bishop of Bayonne is under the Archbishop of Toulouse, and exercises spiritual jurisdiction over three departments. The cathedral is a beautiful ancient building. The arsenal, one of the finest in France, and the mint are among the other remarkable buildings of Bayonne. Bayonne has considerable commerce with Spain; French and foreign goods being exchanged for iron, fruit, gold, and silver. Masts and other timber for ship-building, from the Pyrenees, are exported to Brest and other ports of France. The hams of Bayonne are famous. Ships are built, and woollens, chocolate, soap, &c., are manufactured. Among the lower class, the ancient Biscayan or Basque language is spoken. Catharine de' Medici had an important interview with the Duke of Alba in Bayonne, June, 1565. The meeting of Napoleon with the king of Spain, Charles IV., and the Prince of the Asturias, also took place here in May, 1808, in consequence of which the two last signed (5th and 10th May) an agreement, by which they, and all the children of the king, transferred their rights to the Spanish territories in Europe and India to the French emperor. The Convention of Bayonne, between the Poles and France, was signed on the 10th May, 1808. (See Scholl's Traités de Paix, vol. ix. page 28.)

BAZA (ancient *Basti*), a city, Spain, Andalusia, prov. of, and 53 miles E.N.E. from Granada, in a valley north of the Sierra Baza. It has ill-arranged and for the most part crooked and narrow streets, three squares, a collegiate and two parish churches, a town-hall, several schools, numerous public fountains, fine gardens, and promenades. Manufactures—hats, linen fabrics, earthenware, and gypsum. The environs yield wine and hemp; sheep, cattle, and mules are reared; and an annual fair is held in September. Baza is famed in early Spanish history, more especially in that of Granada. In 1489 it was taken from the Moors by the Spaniards, after a siege of nearly seven months. In 1810 the French, under Marshal

Soult, here defeated the Spaniards under Generals Blake and Freire. Pop. 10,133.

BAZAR, Bazaar, or Basar, a market-place in the East. The word is Arabic, and originally denotes *sale* or *exchange*. Some are open, some covered with lofty ceilings or domes. At the bazars, or in the neighbourhood of them, are the coffee-houses, so much frequented in Turkey, Persia, &c.; and, as the orientals live almost entirely out of doors, the bazars of populous cities, besides their mercantile importance, are of consequence as places of social intercourse. The bazar of Ispahan is one of the most splendid in Persia. That of Tabreez is the largest known. At Constantinople are two bazars, the old and new one. In the oriental tales—for instance, in the Arabian Nights—the bazars occupy a very conspicuous place. Since the system of credit is almost entirely unknown in eastern trade, and all commercial transactions take place in merchandise and money, the places where this merchandise is brought and changed from one owner to another are, of course, very much frequented.—The word *bazar* has also been imported into Europe, where it is used in much the same sense as in the East. It is also applied in this country to a temporary sale of fancy goods contributed gratuitously, and sold to raise a special fund.

BDELLIUM, a kind of aromatic gum, which is found in different countries, but is brought chiefly from Arabia and India. It resembles myrrh in its appearance, and partially also in its effects, and is hence often fraudulently substituted for it. It is also intermixed with gum-arabic. It occurs in oblong or angular pieces, sometimes as large as a walnut, and of a yellow, red, or brown colour. It has a sweet smell but bitter taste, softens readily between the fingers before the fire, and dissolves partially in alcohol, and still more in water. It was formerly used in many compounds and plasters, but is now confined to veterinary medicine. The bdellium mentioned in Gen. ii. was apparently a mineral substance entirely different from the gum.

BEACHES, Raised, the terms by which geologists designate flat tracts of gravelly and sandy deposits which are situated above the actual sea-shore, but were once covered by the water, and have been elevated within a comparatively recent period. Numerous examples are presented by almost all the shores of Europe, and more especially by those of the British Islands. From the different fossils found in them it is evident that the forces which upheaved them must have been exerted at different periods, but their true dates are not yet ascertained.

BEACHY HEAD, a promontory, England, coast of Sussex, between Hastings and Seaford, about 1½ mile south of Eastbourn; lat. 50° 44′ 24″ N.; lon. 0° 12′ 42″ E. It is the highest headland on the south coast of England. In 1828 a revolving light of the first class was erected here, 285 feet above the level of the sea, visible in clear weather from a distance of 28 miles.

BEACON. See Signals and Lighthouse.

BEADLE.—1. A messenger or crier of a court, who cites persons to appear and answer; also called an *apparitor* or *summoner*.—2. An officer in a university, whose chief business is to walk with a mace before the masters in a public procession; or, as in America, before the president, trustees, faculty, and students of a college. The universities of Oxford and Cambridge have each three esquire beadles (or bedels), one being attached to each of the faculties of law, medicine and arts, and divinity. The former university has also three yeomen beadles, and the latter one.—3. An inferior parish officer, whose business is generally to execute the orders of the vestry, by whom he is appointed. These parochial beadles were originally officers given to the rural deans to cite the clergy and church-officers to visitations, and for other purposes.

BEADS, small perforated ornaments, generally of a round shape and made of glass, but also of gold, silver, and other metals, paste, coral, gems, &c. The name, which originally signified 'prayers,' came to be applied to these ornaments, from the fact that strings of them called rosaries have long been used in the Roman Catholic Church to keep count of the number of prayers repeated. The use of them as ornaments belongs to very early times. Glass beads are supposed to have been manufactured by the Phœnicians more than 3000 years before Christ. Beads have been found in the ruins of Assyrian temples, also as decorations of the Egyptian mummies, and in the graves of the ancient Greeks, Romans, and Britons. The manufacture of glass beads was introduced into modern Europe by the Italians, and in the neighbourhood of Venice it is still an important branch of industry. On the island of Murano alone several thousand workmen are employed in this manufacture, and the annual value of the beads manufactured is about £200,000. Birmingham is the chief seat of the manufacture of beads in this country. The total value of the beads imported into the United Kingdom in 1868 was nearly £300,000, but in 1871 it had sunk to £110,000.

BEAGLE, a species of the genus *dog*, kept entirely for hunting hares. They are small, and much inferior to the hare in swiftness, but have a very delicate scent, and seldom fail of running her down.

BEALE, Mary, born in Suffolk in 1632, became a pupil of the celebrated Sir Peter Lely, and attained great eminence as a portrait-painter. Among her portraits are several of the most eminent contemporary clergymen, with whom she appears to have been high in favour. Several of them have been engraved. Her maiden name was Craddock. She died in 1697, survived by her husband Beale, who was a painter and colour maker, and by two sons.

BEAMING is a preliminary operation in weaving which consists in winding the yarn of the warp on the weaver's beam. After the yarn has by the process of warping been wound from the bobbins no which it is spun into a warp of as many lengths as are required for the breadth of the cloth to be woven, the warp is first wound on a stick into a ball, and from the ball is again wound on the weaver's beam, a comb which is capable of being expanded and contracted to suit the length of the beam being used for the purpose of arranging the threads of the yarn in parallel coils. In power-weaving a machine is used called the beam-warping machine, which works by steam, and performs both the operations of warping and beaming at once. When the beam on which the warp is wound by this machine is filled, it is removed to another machine called the slasher sizing-machine, where it forms one of six or eight filled in the same way. In this machine the contents of these beams, after being sized and dried, are wound upon one beam, which afterwards forms the weaver's beam.

BEAMS, strong transverse pieces of timber stretching across the ship from one side to the other, to support the decks and retain the sides at their proper distance, with which they are firmly connected by means of strong knees, and sometimes of standards. They are sustained at each end by thick stringers on the ship's side called shelf-pieces. The main-beam is next abaft the main-mast. The greatest beam of all is called the midship beam. A ship is said to be 'on her beam-ends' when it lies entirely on its side, so that the beams are almost at right

angles to the surface of the water. An object is said to be 'a-beam' when it is in a line with the beams of the ship, and accordingly at right angles to its length. The object is said to be on the starboard or the larboard beam, according as it is on the right or left side of the vessel.

BEAN, a plant belonging to the nat. order Leguminosæ, and the sub-order Papilionaceæ. The earliest allusion in ancient history to the bean is contained in the Bible; but the nature of the soil renders it improbable that it was cultivated in Palestine, and the probability is that the beans used by the Jews were brought by them from the alluvial valley of the Nile in Egypt. The bean was likewise well known to the Romans at an early period of their history, and it was probably through them that its cultivation spread into Northern and Western Europe. The precise period of the introduction of beans into Britain is unknown, but some have supposed that it occurred shortly after the conquest of Spain by the Moors, and that either that country or Portugal furnished the first supply of seed imported to the British Islands. Since then the bean has ramified into many varieties, and formed no inconsiderable item in the list of agricultural and horticultural plants cultivated for the sustenance of man and beast. As an object of rural beauty, gratifying both to sight and smell, few field plants can vie with the bean, laden with its delicately tinted blossoms, exhaling an odour so pleasurable as scarcely to be excelled by the most cherished denizen of the flower-garden.

The seed of the bean is dicotyledonous, that is, composed of two cotyledons or lobes, adhering closely together, but distinctly separate in their parts, except at the base or eye, where they are connected by the embryo of the future plant. The germ or embryo is situated at the base of the seed immediately below the eye, and on that part of the seed which is undermost in the pod when attached to the stalk. At this point there is a triangularly marked appearance on the skin (very well defined in the common horse-bean and other large-seeded varieties), the base of which extends transversely below the germ, and whose apex nearly touches the eye or *hilum* of the seed. When the young plant is fairly above ground its growth is very rapid; the stem shoots upwards, emitting new leaves in quick succession, and does not cease to grow until the seed, the object and end of its existence, is perfected and brought to maturity. In this respect, namely, the continued growth of the stem, leguminous plants differ from the cerealia, the culms of which cease to increase in length long before their seeds are perfectly matured. The field-bean, in this country, takes from five and a half to six months to attain maturity, and the winter variety from nine to ten months. The earlier garden sorts, when sown so late in spring as not to receive any serious check from frost, mature their seeds in little more than four months.

There are two strongly marked and well-defined classes of beans, viz. the field-bean (*Faba vulgaris arvensis*) and the garden-bean (*Faba vulgaris hortensis*); both, however, are included botanically under one species. One of the commonest varieties of the field-bean is the common Scotch or horse-bean. This bean is extensively cultivated in Scotland; so much so that it may be considered as the only sort in general cultivation. It is extremely hardy, and very prolific, especially if the weather has been dry and warm while the pods were filling. The straw averages about 4½ feet long when well grown; and the yield of grain per acre, taking in a large extent of land in the bean-growing districts, may be fairly estimated at 30 bushels (imperial measure), the weight ranging from 60 to 66 lbs. per bushel. On the best soils the yield is sometimes as much as 60 bushels per acre. The Scotch-bean seems better suited to the country from which it takes its name than England or Ireland, excluding the more northerly parts of these two countries, where the climate is similar to that of Scotland. The common tick or field-bean occupies the same position in England that the Scotch-bean does in Scotland, and is frequently called the 'horse-bean.' This and the preceding sort are probably from the same stock—soil, climate, and the continued operation of dissimilar causes for a lengthened period producing the difference which now exists between them. The tick-bean is shorter strawed than the Scotch-bean, and said to be fully more prolific, and also better adapted to light soils. Of the other varieties of the field-bean, the commonest are the Heligoland bean, a hardy sort adapted for rich alluvial soils; the Russian or winter field-bean, the hardiest of all, and less liable than any other to be attacked by the 'black dolphin,' or bean aphis; the early Mazagan and the long-podded bean, the last two of which are also cultivated as garden-beans. In addition to these varieties of the field-bean there are at present in cultivation at least twenty tolerably well-defined varieties and sub-varieties of the garden-bean, including the early Mazagan, and the different sorts of the longpod which have already been mentioned as cultivable both in the field and garden.

All soils of an aluminous or clayey nature, when well drained, are adapted to the growth of beans; the best bean soils, however, are those occupying a middle position between the heavy clays and the light loams. Well-drained clays, firm loams, and hard black land are each of them, both physically and chemically, admirably adapted to the peculiar habits of the bean, and it is only on such soils that its systematic cultivation is at all profitable. Beans are not generally regarded as a fallow crop, yet there are many points in which they present all the features of such a crop. They are only, however, entitled to this designation when cultivated in such a manner as to permit the land to be thoroughly worked and cleaned during their growth; but if merely sown broadcast, the bean crop, in relation to the soil, can lay no claim to the peculiar mechanical and chemical properties which distinguish a green fallow crop from others, during the greater part of whose growth the soil remains undisturbed by hoe or harrow. In order, therefore, to approximate the bean crop as closely as possible to those to which the appellation *fallow* is assigned, the plan adopted in all well-cultivated districts is to treat it, in every respect, by drill-harrowing and hand-hoeing, exactly as in the cultivation of turnips or potatoes. The usual time for sowing all kinds of field-beans, with the exception of the Russian or winter variety, is from the beginning of February to the middle of March; any sooner is unnecessary, and seldom practicable, and if much later the crop is apt to be backward, and liable to be exposed to the dangers attending a late harvest. The practical details connected with the cultivation of the crop vary in different bean-growing districts. The Scotch system of cultivating beans is somewhat different from that pursued in the sister country, more especially as regards the mode of sowing the seed. In England the seed is generally dibbled, but in Scotland it is never dibbled, but either drilled, ploughed in, or sown broadcast.

As regards the chemical conditions required for the growth of beans, the inorganic constituents both of the straw and grain are similar in kind to those of the cerealia, but differ widely in their amount and relative proportions. In this respect the composition of beans approximates more closely to that of turnips

and potatoes. The straw and grain contain large quantities of purely alkaline matter; the alkaline earths, lime, and magnesia, are also important items in the composition of beans. The many published experiments on the growth of beans with artificial manures generally agree in representing dissolved bones, lime, gypsum, glauber-salts, and especially the nitrates of soda and potash, and also common salt, as highly beneficial to the bean crop.

The bean plant is subject to many diseases; among the most formidable is the 'blight,' caused by the attacks of a most voracious species of aphis, known more familiarly as the 'black dolphin fly,' or 'collier aphis.' (See APHIS.) The ravages of this insect generally commence when the beans are beginning to swell in the pods, the farther development of which is quickly arrested by the destruction of the leaves, which are either quickly devoured, or their tissues riddled through and through, and thus rendered incapable of performing their functions of absorption and assimilation. The most effectual remedy yet discovered for arresting the progress of the 'collier,' when once commenced, is to cut off the tops of the bean stalks as soon as the insect is discovered on the leaves; and as it invariably commences operating at the top, working downwards, the removal of the affected portion saves that which is below.

BEAN-GOOSE (*Anser segetum*), a species of wild goose, distinguished from the true wild goose (*Anser ferus*) by its comparatively small and short bill, which, as far as the nostril, is black, and above it of a reddish flesh colour, whereas that of the gray lag, or true wild goose, is orange-red, with a touch of grayish-white. Large flocks regularly descend to the British Islands from the north, and remain till the beginning of May. They feed generally on high grounds, considerably inland, selecting particularly young wheat, stubbles sown down for grass, and, in spring, fields sown with beans, their fondness for which is supposed to have given them their name. They breed chiefly within the Arctic circle, but their nests are often found in large numbers in Harris and others of the Hebrides. The bean-goose being rather less than the common wild goose, but having the same colour, is sometimes provincially called the *small gray goose*.

BEAR (*Ursus*, L.), a genus of carnivorous, or, more accurately, frugi-carnivorous, mammiferous quadrupeds, belonging to a family of the Plantigrada, which tread on the entire soles of the feet. The genus is characterized by a heavy body, covered with a thick woolly coat, a large head, terminating in a prolonged snout, with very extensible lips. The ears are of moderate size, and rather pointed, and the tongue smooth. The limbs are large and heavy, and all the feet are five-toed, and furnished with very strong, hooked claws, which are not retractile, and are well suited for burrowing or climbing trees. In the bear family are comprised the raccoon, badger, wolverine, glutton, &c. The chief species are the brown bear of Europe (*U. arctos*); the white or polar bear (*U. maritimus*); the American or black bear (*U. Americanus*); the grisly bear (*U. horribilis*), also of America; and the long-lipped bear (*U. labiatus*).

The brown bear is chiefly an inhabitant of cold and elevated situations, and feeds on a great variety of animal and vegetable substances. During winter this species, like some others, remains torpid in caves, whither it retires in the autumn very fat, and comes out in the spring extremely emaciated. The brown bear is remarkable for its sagacity, as well as the ferocity of its disposition, and it becomes especially sanguinary as it advances in age. Besides the differences of colour and size which distinguish this bear from those belonging to the old continent, it differs from the American bears by having a convexity of front above the eyes, which renders its physiognomy strikingly dissimilar to theirs. Other distinctions, sufficiently obvious, present themselves when the species are compared.

The Polar or maritime bear is only found in high northern latitudes, along the borders of the Icy Ocean and northern coasts of America in the vicinity of Hudson's Bay. It does not descend to the eastern coast of Siberia nor Kamtschatka; neither is it found in the islands lying between Siberia and America. It is uniformly white, attains a large size, is very powerful, ferocious, and daring. It is an excellent diver and swimmer, being apparently as much at home in the ocean as on land. An individual of this species was seen, by recent northern explorers, in the middle of Melville Sound, swimming across where the shores were at least 30 miles apart. The Polar bear is the most exclusively carnivorous of the genus, though equally capable of living on vegetable food with the rest. He preys upon seals, the cubs of the whale, morse, &c., or the carcasses of whales left by whalers after removing the blubber. Individuals of this species are sometimes, though rarely, seen in caravans of wild animals, where they appear to suffer extremely from heat, as they bathe frequently in water provided for the purpose. When ice is placed in the cage they roll upon it with great satisfaction, and show every sign of being gratified.

The black bear of America is distinguished by its colour and a peculiarly convex facial outline. It is found very generally in mountainous and forest lands, and subsists in a great degree on berries and vegetable substances, though it preys upon small animals and insects, which it searches for industriously, by turning over large logs of decayed timber. It is rarely, if ever, known to attack man, unless in self-defence. It is very fond of young corn, and also of honey, which, being an expert climber, like the brown European bear, it obtains by plundering the wild bees.

The grisly bear inhabits the country adjacent to the Rocky Mountains, and is, of all the race, the most dreadful for size, strength, and terrible ferocity of nature.

The Asiatic or long-lipped bear is a native of the mountainous parts of India, and feeds on white ants, rice, honey, the fruit of the palm, &c. The species is inoffensive and timid, burrows in the ground, and lives in pairs, together with the young, which, when alarmed, seek safety by mounting on the backs of the parents.

BEARD, the hair round the chin, on the cheeks, and the upper lip, which is a distinction of the male sex. It differs from the hair on the head by its greater hardness and its form. The beard begins to grow at the time of puberty. The connection between the beard and puberty is evident from this, among other circumstances, that it never grows in the case of eunuchs who have been such from childhood; but the castration of adults does not cause the loss of the beard. According to Cæsar the Germans thought, and perhaps justly, the late growth of the beard favourable to the development of all the powers. But there are cases in which this circumstance is an indication of feebleness. It frequently takes place in men of tender constitution, whose pale colour indicates little power. The beards of different nations afford an interesting study. Some have hardly any, others a great profusion. The latter generally consider it as a great ornament; the former pluck it out; as, for instance, the American Indians.

The character of the beard differs with that of the individual, and, in the case of nations, varies with

the climate, food, &c. Thus the beard is generally dark, dry, hard, and thin in irritable persons of full age: the same is the case with the inhabitants of hot and dry countries, as the Arabians, Ethiopians, East Indians, Italians, Spaniards. But persons of a very mild disposition have a light-coloured, thick, and slightly curling beard: the same is the case with inhabitants of cold and humid countries, as Holland, Britain, Sweden. The difference of circumstances causes all shades of variety. The nature of the nourishment likewise causes a great variety in the beard. Wholesome, nutritious, and digestible food makes the beard soft; but poor, dry, and indigestible food renders it hard and bristly.

In general the beard has been considered with all nations as an ornament, and often as a mark of the sage and the priest. Moses forbade the Jews to shave their beards. With the ancient Germans the cutting off another's beard was a high offence: with the East Indians it is severely punished. Even now the beard is regarded as a mark of great dignity among many nations in the East, as the Turks. The custom of shaving is said to have come into use in modern times during the reigns of Louis XIII. and XIV. of France, both of whom ascended the throne without a beard. Courtiers and inhabitants of cities then began to shave, in order to look like the king, and, as France soon took the lead in all matters of fashion on the continent of Europe, shaving became general; but it was only from the beginning of the last century that shaving off the whole beard became common. Till then fashion had given divers forms of mustaches and beards. It is only in comparatively recent times that beards and mustaches have again become common, the example in this respect having been set by France. It is now rare to see a clean-shaved face, either beard or mustache, or both, being almost invariably worn, and cut according to the taste of the wearer.

Much has been said on the utility of a full beard to persons exposed to breathe air charged with deleterious dust, as masons, &c. It is not to be denied that the mouth, one of the most expressive parts of the countenance, is shown to much better advantage in consequence of shaving; but, at the same time, old age appears to much greater disadvantage, the beard concealing the loss of the teeth. Moreover, the eye gains much in expression by a full beard. Every one knows the trouble of shaving; and who does not remember Byron's computation of the amount of this trouble in Don Juan? Seume, a German author, says, in his journal, 'To-day I threw my hair-powder apparatus out of the window: when will come the blessed day that I shall send the shaving apparatus after it!' Perhaps the best description of the miseries of shaving is to be found in the Noctes Ambrosianæ.

Shaving, among many ancient nations, was the mark of mourning; with others, it was the contrary. Plutarch says that Alexander introduced shaving among the Greeks, by ordering his soldiers to cut off their beards; but it appears that this custom had prevailed before among the Macedonians. The Romans began to shave about 454 A.U., 296 B.C., when a certain Ticinius Mena, a barber from Sicily, introduced this fashion. Scipio Africanus was the first who shaved every day. The day that a young man first shaved was celebrated, and the first hair cut off was sacrificed to a deity. Hadrian, in order to cover some large warts on his chin, renewed the fashion of long beards; but it did not last long. In mourning the Romans wore a long beard, sometimes for years. They used scissors, razors, tweezers, &c., to remove the beard. The public barbers' shops (*tonstrinæ*), where the lower classes went, were much resorted to; rich people kept a shaver (*tonsor*) among their slaves.

BEAR LAKE, The Great, an extensive sheet of fresh water in the north-west part of North America, on the Arctic Circle, between about 65° and 67° 32′ N. lat.; and under the 20th degree of W. lon. It is of irregular shape, and measures 170 miles north to south and east to west. Its depth has not been ascertained, but where tried no bottom was found with 270 feet of line. The water is remarkably transparent, and appears of a light blue colour. It abounds with fish, particularly with a kind known by the name of 'the herring salmon of Bear Lake.' The Bear Lake River flows from it to the Mackenzie River.

BEARN, before the revolution a province of France, at the foot of the Pyrenees, with the title of a principality; about 42 miles long and 36 broad; bounded E. by Bigorre, N. by Armagnac, Tursan, and Chalosse, W. by Dax, a part of Soule, and the Lower Navarre, and S. by the Pyrenees. It belonged, with Navarre, to Henry IV., when he obtained the crown. The plain country is very fertile, and the mountains are covered with fir-trees, while within are mines of copper, lead, and iron; and the little hills are planted with vines, which yield good wine. It is now chiefly included in the department of Lower Pyrenees. Pau is the chief town. There is a peculiar and well-marked dialect—the Bearnese—spoken in this district, which has much more affinity with the Spanish than with the French. It contains a certain number of Greek elements, which some believe to have been derived from the ancient Greek colonists established in Gaul. The people have retained many old-world manners, customs, and superstitions, as well as their old costume. Pop. about 400,000.

BEAS, or Beyas (ancient *Hyphasis*), one of the great rivers of the Punjab, having its rise at the Ratanki Pass, on the south side of the Santch Mountains, a branch of the Himalaya system, in lat. 32° 21′ N.; lon. 77° 22′ E.; where the former attain an elevation of 13,300 feet. From this point the Beas flows generally in a south direction for about 50 miles, when it turns west and north-west till it reaches the eastern margin of the Punjab, a distance of about 90 miles, when it proceeds S.S.W. for 75 miles, forming throughout that space the east boundary, and is then joined by the Sutlej, about 8 miles N.N.E. from Sobraon; lat. 31° 10′ N.; lon. 75° 2 E. Its entire course is thus about 215 miles. The Beas has been considered larger than the Sutlej, but it is greatly inferior to that river in the length of its course; and, according to Burnes, though they have about the same breadth each—200 yards—the Sutlej has the greater volume of water. The united stream, below the point of junction, is called the Ghara or Gharra.

BEATIFICATION, in the Roman Catholic Church an act by which the pope declares a person beatified or blessed after his death. It is the first step to canonization, that is, the raising one to the honour and dignity of a saint. No person can be beatified till fifty years after his or her death. All certificates or attestations of virtues and miracles, the necessary qualifications for saintship, are examined by the Congregation of Rites. This examination often continues for several years; after which his holiness decrees the beatification. The corpse and relics of the future saint are from thenceforth exposed to the veneration of all good Christians; his image is crowned with rays, and a particular office is set apart for him; but his body and relics are not carried in procession. Indulgences likewise, and remissions of sins, are granted on the day of his beatification;

which, though not so pompous as that of canonization, is, however, very splendid. Beatification differs from canonization in this, that the pope does not act as a judge in determining the state of the beatified, but only grants a privilege to certain persons to honour him by a particular religious worship, without incurring the penalty of superstitious worshippers; but in canonization the pope speaks as a judge, and determines, *ex cathedra*, upon the state of the canonized. Beatification was introduced when it was thought proper to delay the canonization of saints, for the greater assurance of the truth of the steps taken in the procedure. Some particular orders of monks have assumed to themselves the power of beatification. Thus Octavia Melchiorica was beatified by the Dominicans. See CANONIZATION.

BEATON, DAVID, Archbishop of St. Andrews, and cardinal, was born in 1494. Pope Paul III. raised him to the rank of cardinal in December, 1538; and, being employed by James V. in negotiating his marriage at the court of France, he was there consecrated Bishop of Mirepoix. Soon after his instalment as archbishop, he promoted a furious persecution of the reformers in Scotland; but the king's death put a stop for a time to his arbitrary proceedings, he being then excluded from affairs of government, and confined. He raised, however, so strong a party, that, upon the coronation of the young queen Mary, he was admitted into the council, made chancellor, and received a commission as legate *a latere* from Rome. He now began to renew his persecution of heretics, and among the rest, of the famous Protestant preacher George Wishart, whose sufferings at the stake he viewed from his window with apparent exultation. At length a conspiracy was formed against him, and he was assassinated at his own castle of St. Andrews, on the 29th May, 1546. He united with great talents equally great vices, and left several children, the fruit of open concubinage.

BEATSON, ROBERT, a laborious miscellaneous writer, born at Dysart, in Scotland, 1742; died at Edinburgh, 1818. He followed the military profession, and served as lieutenant in the attack on Martinique and the taking of Guadeloupe. He afterwards, in his latter years, held the situation of barrack-master at Aberdeen. His publications were, A Political Index to the Histories of Great Britain and Ireland; Naval and Military Memoirs of Great Britain (1790, three vols. 8vo, 2d edit. 1804, six vols.); View of the Memorable Action of the 27th July, 1778 (1791, 8vo); Essay on the Comparative Advantages of Vertical and Horizontal Windmills (1798, 8vo); Chronological Register of Both Houses of Parliament from 1706 to 1807 (1807, three vols. 8vo).

BEATTIE, JAMES, LL.D., a pleasing poet and miscellaneous writer, was born at Lawrencekirk, in the county of Kincardine, in 1735. He lost his father when he was only seven years of age, but was placed early at the only school his birth-place afforded, whence he was removed to Marischal College, Aberdeen. He there studied Greek under the principal, T. Blackwell, and made a general proficiency in every branch of education, except mathematics. In 1753 he obtained the degree of A.M., and accepted the office of schoolmaster and parish-clerk to the parish of Fordoun, looking forward to the Church of Scotland as his principal prospect, for which reason he still attended, during winter, the divinity lectures at Marischal College. In June, 1758, these views were somewhat changed by the attainment of the situation of one of the masters of the grammar-school of Aberdeen. In 1760 he published a volume of poems, which were received favourably, but which he subsequently thought very little of, and endeavoured to buy up. The same year the patronage of powerful friends obtained him the appointment of professor of moral philosophy and logic at Marischal College. In 1765 he published a poem, the Judgment of Paris (4to), which proved a failure, although it was afterwards added to a new edition of his poems in 1766.

The work which procured him the greatest fame was his Essay on Truth, which first appeared in 1770. It was so popular that, in four years, five large editions were sold; and it was translated into several foreign languages. Among other marks of respect, the University of Oxford conferred on the author the degree of LL.D.; and George III. honoured him, on his visit to London, with a private conference and a pension. He was also solicited to enter the Church of England by flattering proposals from the Archbishop of York and the Bishop of London; which proposals he declined, lest his opponents should attribute the change to self-interest. The popularity of this celebrated essay, which was written in opposition to the prevalent scepticism of Hume and others, was principally owing to its easiness of style, and to a mode of treating the subject calculated for the meridian of slight scholarship and medium intellect. This is often a great source of immediate celebrity; but, thus produced, it is usually as transitory as spontaneous, which has proved the case in the present instance.

A few months after the appearance of the Essay on Truth, he published (1771) the first book of the Minstrel (4to), and in 1774, the second; which pleasing poem is, indisputably, the work by which he will be the longest remembered. To a splendid edition of his Essay on Truth, published by subscription, in 1776, he added some miscellaneous dissertations on Poetry and Music, Laughter and Ludicrous Composition, &c. In 1783 he published Dissertations, Moral and Critical (4to); and in 1786 appeared his Evidences of the Christian Religion (two vols. 12mo). In 1790 he published the first volume of his Elements of Moral Science, the second of which followed in 1793; and to the latter was appended a dissertation against the slave-trade. His last publication was an Account of the Life, Character, and Writings of his eldest son, James Henry Beattie, an amiable and promising young man, who died at the age of twenty-two, in 1790. This great affliction was followed, in 1796, by the equally premature death of his youngest and only surviving son, in his eighteenth year; which losses, added to the melancholy loss of reason by his wife, wholly subdued his constitution; and, after two paralytic strokes, he died at Aberdeen, in August, 1803. Beattie was a religious and an amiable man, but constitutionally more calculated for a poet than a philosopher, and for a pleader than a controversialist. He was, however, a respectable, if not a strong writer, and is now perhaps less read than he deserves.

BEAUCAIRE, a small, well-built, commercial city of France, with 9395 inhabitants, in the department of the Gard, on the right bank of the Rhone opposite Tarascon, with which it communicates by a fine suspension-bridge, at the commencement of the Beaucaire and Aigues-Mortes Canal, and connected with several lines of railway. It has a commodious harbour for vessels which come up from the Mediterranean, seven leagues distant, and has considerable commerce and some manufactures; but is chiefly famous for its great fair (founded in 1217, by Raymond II., count of Toulouse), held yearly from the 21st to the 28th July. Merchants from all parts of Europe, and even from the coast of Africa, attend with their goods; and almost every kind of article, however rare, is to be purchased here; though silks, woollens, printed cottons, leather, wool, wine, brandy,

olive-oil, and fruits, are the chief objects of sale. Sales are effected to the amount of about 30,000,000 francs a-year, and the number of strangers amounts to 80,000 or 100,000. These are partly obliged to camp out in a meadow on the banks of the river.

BEAUFORT, HENRY, natural son of John of Gaunt and half-brother of Henry IV., king of England, was made Bishop of Lincoln, whence he was translated to Winchester. He was also nominated chancellor of the kingdom, and sent ambassador to France. In 1426 he received a cardinal's hat, and was appointed legate in Germany. In 1431 he crowned Henry VI. in the great church of Paris. He died at Winchester, 1447. He was a haughty, turbulent prelate, and Shakspeare is considered as giving a true portrait of him in his Henry VI.

BEAUGENCY (ancient *Belgenciacum*, *Castrum de Belgency*), a town, France, department Loiret, 16 miles S.W. of Orleans, agreeably situated on the side of a hill, on the right bank of the Loire, which is here crossed by a stone bridge of thirty-nine arches. The town was formerly surrounded by a wall flanked by towers and bastions, parts of which still remain. The square donjon tower of Beaugency, 115 feet high, is a remarkable structure of high antiquity, probably of the tenth or eleventh century, though the exact date of its erection is unknown. The articles manufactured here are principally cloth and leather. There are also some distilleries and a considerable trade in wine. In the Franco-German war General Chanzy was defeated here by the Grand-duke of Mecklenburg on the 7th and 8th Dec. 1870, on the latter of which days the town was occupied by the Germans. Pop. 5029.

BEAUHARNAIS, ALEXANDRE, VISCOUNT, was born in 1760 in Martinique. He served with distinction as major in the French forces under Rochambeau which aided the United States in their revolutionary war, and married Josephine Tascher de la Pagerie, who was afterwards the wife of Napoleon. At the breaking out of the French revolution he was chosen a member of the National Assembly, of which he was for some time president, and which he opened, after the king's departure, with the following words:—'*Messieurs, le roi est parti cette nuit: passons à l'ordre du jour.*' In 1792 he was general of the army of the Rhine, and in 1793 refused the appointment of minister of war. In consequence of the decree removing men of noble birth from the army, he retired to his country-seat. He was falsely accused of having promoted the surrender of Mentz, and was sentenced to death July 23, 1794, when thirty-four years old. (For information respecting his son Eugene, and his elder brother François, see next two articles; respecting his daughter Hortense, see BONAPARTE, LOUIS.)

BEAUHARNAIS, EUGENE DE, Duke of Leuchtenberg, Prince of Eichstädt, ex-viceroy of Italy, was born September 3, 1781. He was the son of Alexandre Beauharnais (see above), who was guillotined in 1794, and Joséphine Tascher de la Pagerie, afterwards wife of Napoleon and Empress of France. During the French revolution Eugene entered the military service, and at the age of twelve years accompanied his father when he took the command of the army of the Rhine. After his father's death he joined Hoche in La Vendée, and subsequently studied for a time in Paris. In 1796 Joséphine was married to Napoleon Bonaparte, then commander-in-chief of the army of Italy, and Eugene accompanied his father-in-law in his campaigns in Italy and Egypt. He was promoted to a high rank in the service, and in 1805 created a prince of France and viceroy of Italy. In the same year he distinguished himself in the campaigns against Austria, and after the peace of January 13, 1806, married the Princess Augusta of Bavaria. In 1807 Napoleon made him Prince of Venice, and declared him his heir to the kingdom of Italy. He administered the government of Italy with great prudence and moderation, and was much beloved by his subjects. In the war of 1809 he was at first unsuccessful against the Archduke John, but soon afterwards gained the battle of Raab, and distinguished himself at Wagram. He conducted himself with great prudence on the occasion of the divorce of Napoleon from his mother. In the Russian campaign he commanded the third *corps d'armée*, and distinguished himself in the battles of Ostrowno, Mohilo, and that on the Moskwa (Borodino). In the disastrous retreat he did not desert the wrecks of his division for a moment, but shared its toils and dangers with the soldiers, and encouraged them by his example. To him and to Ney France was indebted for the preservation of the remains of her army during that fatal retreat. On the departure of Napoleon and Murat he was left in the chief command, and showed great talent at that dangerous conjuncture. We find him again at the battle of Lützen, of May 2, 1813, where, by surrounding the right wing of the enemy, he decided the fate of the day. Napoleon sent him from Dresden to the defence of Italy, now menaced by the enemy's forces, where military operations commenced after the dissolution of the congress of Prague, and the accession of Austria to the league of the allied powers. Eugene maintained the defence of Italy even after the desertion of Murat. After the fall of Napoleon he concluded an armistice with Count Bellegarde, by which he delivered Lombardy and all Upper Italy to the Austrians. Eugene then went immediately to Paris, and thence to his father-in-law at Munich. He was at the Congress of Vienna. On the return of Napoleon from Elba he was obliged to leave Vienna and retire to Baireuth. He was an inactive spectator of the events in 1815. By an ordinance of the King of Bavaria, his father-in-law, he was created Duke of Leuchtenberg, November, 1817. The Bavarian principality of Eichstädt was bestowed upon him, and his posterity declared capable of inheriting in case of the failure of the Bavarian line. He died at Munich, February 21, 1824, leaving two sons and four daughters. Prince Eugene, under a simple exterior, concealed a noble character and great talents. Honour, integrity, humanity, and love of order and justice were the principal traits of his character. Wise in the council, undaunted in the field, and moderate in the exercise of power, he never appeared greater than in the midst of reverses, as the events of 1813–1814 prove. See Vie Politique et Militaire d'Eugène Beauharnais, Vice-roi d'Italie, by Aubriet (second edition, Paris, 1825).

BEAUHARNAIS, FRANÇOIS, MARQUIS DE, was born at La Rochelle, August 12, 1756. He violently opposed the motion of his younger brother, the Viscount Alexandre, to take from the king the chief command of the army, and would not listen to any of the amendments proposed, saying, '*Il n'y a point d'amendement avec l'honneur.*' He was called in consequence of this, *Le Féal Beauharnais sans Amendement*. In 1792, with the Count d'Hervilly, the Baron de Viomenil, and others, he formed the project of a new flight of the royal family; but the arrest of his companion, the Baron Chambon, prevented the execution of the plan. He was appointed major-general in the army of the Prince of Condé, and wrote, in 1792, to the president of the National Assembly, protesting against their unlawful treatment of the king, and offering to appear himself among his defenders. When Bonaparte became first consul, the marquis sent him a letter, in which he exhorted him, by the glory which he would gain by such a course, to re-

store the sceptre to the house of Bourbon. Having at last recognized the emperor, he was sent by him as ambassador to Florence and Madrid; but having afterwards fallen into disgrace he was banished. After the restoration he returned to Paris, where he died January 10, 1819.

BEAUMARCHAIS, PIERRE AUGUSTIN CARON DE, the author of the Barber of Seville, and Marriage of Figaro, was born at Paris in 1732. He was the son of a watchmaker, who destined him for his trade. He early gave striking proofs of his mechanical and also of his musical talents. He was afterwards the teacher on the harp of the daughters of Louis XV., and was admitted into their society. By a rich marriage he laid the foundation of the immense wealth which he afterwards accumulated by his speculations, and which was also increased by a second marriage. In the meantime he occupied himself with literature and published the dramas of Eugénie in 1767, and Les Deux Amis in 1770. The first still holds its place on the stage. He showed all his talents in his lawsuit against Goezman and Lablache, when he wrote against the former (who belonged to the *parlement Maupeou*, so called, which was engaged in a dispute with the ministry) his celebrated Mémoires (Paris, 1774), which entertained all France. He did not gain his suit however. The fame of his Mémoires alarmed even Voltaire, who was jealous of every kind of glory. The Barber of Seville (1775) and the Marriage of Figaro (1784) have given him a permanent reputation. In 1792 he wrote La Mère Coupable, but never regained his former fame. His last work was Mes Six Epoques, in which he relates the dangers to which he was exposed in a revolution in which a celebrated name, talent, and riches, were sufficient causes of proscription. He still possessed, at the age of more than sixty, all the vigour of his youth, but was afflicted with deafness. He lost about a million livres by his famous edition of the works of Voltaire (1785), which, notwithstanding its immense cost, was very imperfectly executed. He lost still more at the end of 1792 by his attempt to provide the French army with 60,000 muskets. Discontented with the present, despairing of the future, wearied with struggling against the revolution and his creditors for the ruins of his wealth, he died at the age of sixty-nine years without any particular disease, in May, 1799. In 1809 an edition of his works appeared in seven vols.; a later edition in one vol. came out in 1835. Beaumarchais was a singular instance of versatility of talent, being at once an artist, politician, projector, merchant, and dramatist. He was passionately fond of celebrity. His Marriage of Figaro excited one of those extraordinary sensations for which Paris has always been remarkable. The English modifications and versions of this comedy convey but a slight notion of the mischievous subtlety and deep spirit of intrigue in the original.

BEAUMARIS, a seaport town, North Wales, Isle of Anglesey. It is situated on the W. shore of the Menai Strait, near its junction with the Irish Sea, where it expands into a good roadstead called Beaumaris Bay; lat. 53° 16′ N.; lon. 4° 5′ W. It consists of several streets, well paved and clean; houses in general good, particularly in the principal street, which is terminated by the ancient castle of Beaumaris, erected by Edward I.; while many modern dwellings of very handsome appearance have lately arisen in various parts of the town and vicinity. The chief public buildings, exclusive of the churches, are the town-hall, a commodious and handsome edifice, the county-hall, the jail, and a custom-house. The places of worship comprise the chapel of St. Mary, a spacious and elegant structure in the later style of English architecture, with a lofty, square, embattled tower; and several chapels for Dissenters. The harbour is safe and commodious, and may be entered at any time of tide with a moderate breeze. Beaumaris unites with Amlwch, Holyhead, and Llangefni in sending a member to the House of Commons. Pop. in 1871, 2234.

BEAUMONT, FRANCIS, and FLETCHER, JOHN, two eminent English dramatic writers, of whose lives but little is known. The former was born in 1586, ten years after the latter, and died in 1615, ten years before him. His family had its seat at Grace-Dieu, in Leicestershire, where he was born, and his father became a judge of the Common Pleas. He entered Broadgate Hall (now Pembroke College), Oxford, as a gentleman-commoner in 1596, and afterwards studied law for a short time at the Inner Temple. At the age of sixteen he published a translation, in verse, of Ovid's fable of Salmacis and Hermaphroditus, and before nineteen became the friend of Ben Jonson. He married Ursula, daughter and co-heir of Henry Isley of Sundridge, in Kent, by whom he left two daughters. He was only twenty-nine years old when he died. He was buried near the entrance of St. Benedict's Chapel, in Westminster Abbey, but his resting-place is marked by no monument. Several of the Beaumont family were distinguished as poets, among whom we may mention Sir John Beaumont, the elder brother of the dramatist, who wrote Bosworth Field, and improved our rhyme couplet, and Francis Beaumont, a cousin of the dramatist.——JOHN FLETCHER was born in London in 1576. His father was a dignitary of the church, who, after having been dean of Peterborough, was appointed Bishop of London. The poet was admitted to Bene't College, Cambridge, in 1591, where he is said to have acquired a large amount of classical lore. The Woman-Hater, produced in 1606–7, is the earliest work known to exist in which he had a hand, but it is probable that he wrote before this. Little is known of the circumstances in which his life was passed. It does not appear that he was ever married. He died in London of the plague in his forty-ninth year, Aug. 1625, and was buried at St. Saviour's, Southwark. Two cousins of his, Giles and Phineas Fletcher (which see), also distinguished themselves as poets. The friendship of Beaumont and Fletcher, like their literary partnership, was singularly close; they lived in the same house, and are said to have even had their clothes in common. The works that pass under their names consist of fifty-two plays, a masque, and some minor poems. The masque was written by Beaumont alone, and it is believed that all the minor poems except one are his also. He is said to have had a share in only seventeen of the fifty-two plays, but it is difficult and indeed impossible to determine with certainty the respective shares of the two poets in these productions. According to the testimony of some of their contemporaries, Fletcher was the inventing genius, while Beaumont, though the younger, was more distinguished for maturity and correctness of judgment. Shakspeare was their model, and, like him, they intermix pathetic and low comic scenes; but their attempts to surpass their model sometimes lead them into extravagances. Shakspeare is believed by some critics to have had a hand as well as Fletcher in the composition of the fine play of the Two Noble Kinsmen, founded on Chaucer's Knight's Tale. The desire of pleasing the public at times induces them to deviate from a correct standard of taste. Their contemporaries preferred them even to Shakspeare, affirming that the English drama reached its perfection in them. Impartial posterity has reversed this decision, and adjudged the palm to Shakspeare.

Their writings are greatly disfigured by coarseness and indecency. They are said to have frequented taverns and alehouses to study the human character, and to have been arrested while disputing in such a place respecting the conclusion of a play. One wished to have the king in the piece to be assassinated, the other opposed it; and being overheard, they were apprehended on suspicion of conspiring the death of their sovereign. Among the best of their plays are the tragedies of Valentinian, Thierry and Theodoret, King and No King, Philaster, and the Maid's Tragedy; the comedies Rule a Wife and Have a Wife, Wit without Money, The Knight of the Burning Pestle, The Spanish Curate, The Scornful Lady, and the pastoral tragi-comedy in rhyme of the Faithful Shepherdess.

BEAUMONT, Sir George, born of an ancient family in Leicestershire in 1753, possessed considerable skill as a landscape-painter, but was noted more especially as a munificent patron of the arts. The establishment of the National Gallery was mainly owing to his exertions, and sixteen of its fine paintings, chiefly landscapes, including one by N. Poussin, three by Claude, and the Blind Fiddler of Wilkie, were his gifts. He died in 1827.

BEAUNE, a town, France, department Côte d'Or, at the foot of a hill on the Bouzeoise, 23 miles s.s.w. Dijon, with 10,907 inhabitants. It is surrounded with planted ramparts, which furnish a pleasant promenade; is well built, and has a handsome church, and a large hospital, founded in 1443 by Nicholas Rollin, chancellor of Philip the Good, duke of Burgundy. Beaune has also a public library containing about 42,000 vols. with 500 manuscripts, a very fine public garden, a theatre, &c. Its manufactures, though still of some importance, have never recovered the shock which they received by the revocation of the Edict of Nantes, when 200 Calvinistic families, who gave employment to 2000 workmen, were driven into exile. The trade is chiefly in the Burgundy wines of the district, and in agricultural produce. The celebrated Gaspard Monge, the chief improver, if not inventor, of descriptive geometry, and one of the founders of the polytechnic school, was born here, and a monument was erected to him here in 1849.

BEAUSOBRE, Isaac, born in 1659 at Niort in France, studied at Saumur, and being of a good family, with powerful connections, was at first intended for the law. His own inclinations were decidedly in favour of the church; and in 1683 he became Protestant minister of Chatillon-sur-Indre. In the persecuting spirit of the time the church had been closed by fixing the royal seal upon the gate. Beausobre held special services in his own house, and being for this reason obliged to flee, sought an asylum at Rotterdam. Shortly after he became chaplain to the Princess of Anhalt at Dessau, which he quitted in 1694, when he became minister to French Protestants at Berlin. He enjoyed much of the favour both of Frederick William I. and of the crown-prince, afterwards Frederick the Great, and died in 1738. His most remarkable work is the Histoire Critique de Manichée et du Manichéisme (1734).

BEAUTY, The Beautiful. Endless discussions have been carried on by philosophers as to what constitutes beauty or the beautiful. Some are content to define it by the impression it produces on us, and say that the beautiful is that which pleases; others maintain that order and harmony of parts produces the feeling of the beautiful; a third party, following Leibnitz, Wolff, and Baumgarten, say that it consists in perfection; a fourth, with Crousaz, refer it to unity united with variety, while a small body would place the quality of beauty in the fitness or suitableness of things to fulfil the end for which they are intended, that is in their utility. The majority, on the contrary, oppose the beautiful to the useful, and maintain that they are essentially different. Some modern philosophers, M. Jouffroy in particular, make beauty consist in expression, in the manifestation of the invisible by the visible, of the sentiments of the soul by bodily forms—but this is only carrying the difficulty a step farther back. The term beautiful indeed is applied to so many things belonging to essentially different classes, that it seems impossible to give any single definition that will embrace all beautiful objects considered in themselves or objectively; thus we speak of physical beauty, intellectual beauty, moral beauty; real beauty, ideal beauty; essential beauty, conventional beauty; natural beauty, imitative beauty; simple beauty, complex beauty, &c. However, if we confine our consideration of the beautiful solely to the effect it produces on us; that is, if we treat it subjectively, we may say that the beautiful is not simply that which pleases, but that which charms—that which excites the sentiments of love or admiration. The word beautiful appears to have been applied originally to a single class of objects; namely, those that charm the eye. The study of the beautiful has given rise to many interesting researches, and has become the object of a special science—the science of Æsthetics. Among authors who have written on beauty are Plato, Plotinus, Crousaz, Hutcheson, Hogarth, Alison, Burke, Dugald Stewart, Jouffroy, Baumgarten, Kant, Hegel, &c.

BEAUVAIS (ancient *Bratuspantium*, *Bellovacum*), a town, France, capital of the department of Oise, 43 miles n. of Paris, with 15,307 inhabitants. It stands in a rich valley inclosed by wooded hills, at the confluence of the Avelon with the Therain; and though poorly built, derives great interest from its antiquity and the prodigious number of wooden sculptures and statues which decorate the houses. It existed in the time of the Romans, and in 1472 resisted an army of 80,000 Burgundians under Charles the Bold. On this occasion the women particularly distinguished themselves, and one of them, Jeanne Hachette, seeing a soldier planting a standard on the wall, seized it and hurled him to the ground. The procession which annually commemorates the raising of the siege is headed by the women bearing Jeanne Hachette's standard. The principal edifice is the cathedral, which has the loftiest choir in the world, and beautifully painted glass, executed by the most celebrated masters of the art. The town-house is the finest modern structure. The principal manufacturing establishment is the tapestry and carpet manufactory, famed for the beauty of its products, and employing about 400 hands; and there are also considerable manufactures of flannel, broadcloth, leather, hats, porcelain, and wax-candles. It has also large bleachfields, tanneries, and dye-works. The trade, both in the articles of manufacture and in agricultural produce, is extensive.

BEAUVOIS, Ambrose Joseph Palisot de, a celebrated naturalist, born at Arras in 1752, was educated for the law, but after commencing practice abandoned it and devoted himself entirely to natural history, which, from an early period, had occupied the greater part of his time. An expedition to the west coast of Africa having been planned by the French government, Palisot volunteered to accompany it at his own expense. He accordingly sailed in 1786, and had made many valuable collections when the state of his health obliged him to embark for St. Domingo in 1788. Thence he proceeded to America, where he resumed his favourite pursuits in

natural history, and was rewarded by the discovery of the jaws and molar teeth of the great mastodon, on the banks of the Ohio. He afterwards returned to France, and devoted the remainder of his life to the arrangement and publication of his collections. Comparatively few of them had arrived in safety, but out of the wreck he managed to procure materials for the important publications on which his fame chiefly rests. The most valuable is his Flore d'Oware et de Benin, in twenty parts folio. One of the most curious plants contained in it has been named after him Belvisia. He died in 1820.

BEAVER (*Castor*), a genus of claviculated mammiferous quadrupeds, of the order Rodentia, or gnawers.—It is only in a state of nature that the beaver displays any of those singular modes of acting which have so long rendered the species celebrated. These may be summed up in a statement of the manner in which they secure a depth of water that cannot be frozen to the bottom, and their mode of constructing the huts in which they pass the winter. They are not particular as to the site which they select for the establishment of their dwellings, but if it is in a lake or pond, where a dam is not required, they are careful to build where the water is sufficiently deep. In standing waters, however, they have not the advantage afforded by a current for the transportation of their supplies of wood, which, when they build on a running stream, is always cut higher up than the place of their residence, and floated down. The materials used for the construction of their dams are the trunks and branches of small birch, mulberry, willow, and poplar trees, &c. They begin to cut down their timber for building early in the summer, but their edifices are not commenced until about the middle or latter part of Aug., and are not completed until the beginning of the cold season. The strength of their teeth, and their perseverance in this work, may be fairly estimated by the size of the trees they cut down. Dr. Best informs us that he has seen a mulberry-tree eight inches in diameter, which had been gnawed down by the beaver. We were shown, while on the banks of the Little Miami River, several stumps of trees which had evidently been felled by these animals, of at least five or six inches in diameter. The trees are cut in such a way as to fall into the water, and then floated towards the site of the dam or dwellings. Small shrubs, &c., cut at a distance, they drag with their teeth to the stream, and then launch and tow them to the place of deposit. At a short distance above a beaver dam the number of trees which have been cut down appears truly surprising, and the regularity of the stumps might lead persons unacquainted with the habits of the animals to believe that the clearing was the result of human industry.

The figure of the dam varies according to circumstances. Should the current be very gentle, the dam is carried nearly straight across; but when the stream is swift, it is uniformly made with a considerable curve, having the convex part opposed to the current. Along with the trunks and branches of trees they intermingle mud and stones, to give greater security; and when dams have been long undisturbed and frequently repaired, they acquire great solidity, and their power of resisting the pressure of water, ice, &c., is greatly increased by the willow and birch occasionally taking root, and eventually growing up into something like a regular hedge. The materials used in constructing the dams are secured solely by the resting of the branches, &c. against the bottom, and the subsequent accumulation of mud and stones by the force of the stream or by the industry of the beavers.

The dwellings of the beavers are formed of the same materials as their dams, are very rude, and adapted in size to the number of their inhabitants: seldom more than four old, or six or eight young ones, are found in one of the lodges, though double that number have been sometimes seen. In building their houses they place most of the wood crosswise, and nearly horizontally, observing no other order than that of leaving a cavity in the middle. Branches projecting inwards are cut off with their teeth, and thrown among the rest. The houses are not of sticks, and then plastered, but of all the materials used in the dams—sticks, mud, and stones, if the latter can be procured. This composition is employed from the foundation to the summit. The mud is obtained from the adjacent banks or bottom of the stream or pond near the door of the hut. The beaver always carries mud or stones by holding them between his fore paws and throat. Their work is all performed at night, and with much expedition. When straw or grass is mingled with the mud used in building, it is an accident owing to the nature of the spot whence the mud is obtained. As soon as any portion of the materials is placed, they turn round and give it a smart blow with the tail. The same sort of blow is struck by them on the surface of the water when they are in the act of diving. The outside of the hut is covered or plastered with mud late in the autumn, and after frost has begun to appear. By freezing it soon becomes almost as hard as stone, effectually excluding their great enemy the wolverene during the winter. Their habit of walking over the work frequently has led to the absurd idea of their using the tail as a trowel. The houses are generally from 4 to 6 feet thick at the apex of the cone; some have been found as much as 8 feet thick at top. The door or entrance is always on the side farthest from land, and is near the foundation or a considerable depth under water: this is the only opening into the hut. The large houses are sometimes found to have projections of the main building thrown out, for the better support of the roof, and this circumstance has led to all the stories of the different apartments in beaver huts. These larger edifices, so far from having several apartments, are double or treble houses, the parts having no communication except by water. It is a fact, that the musk-rat is sometimes found to have taken lodgings in the huts of the beaver. The otter also occasionally intrudes: he, however, is a dangerous guest, for, should provisions grow scarce, it is not uncommon for him to devour his host. All the beavers of a community do not co-operate in fabricating houses for the common use of the whole. The only affair in which they have a joint interest, and upon which they labour in concert, is the dam. Beavers also make excavations in the adjacent banks, at regular distances from each other, which have been called *washes*. These are so enlarged within, that the beaver can raise his head above water to breathe without being seen, and when disturbed at their huts they immediately swim under water to these washes for greater security, where they are easily taken by the hunters.

The food of the beaver consists chiefly of the bark of the aspen, willow, birch, poplar, and occasionally alder: to the pine it rarely resorts, unless from severe necessity. They provide a stock of wood from the trees first mentioned during summer, and place it in the water opposite the entrance into their houses.

The beaver produces from two to five at a litter. It is a cleanly animal, and always performs its evacuations in the water at a distance from the hut: hence no accumulation of filth is found near their dwellings.

The beaver is about two feet in length; its body thick and heavy; the head compressed, and somewhat arched at the front, the upper part rather narrow; the snout much so. The eyes are placed rather high on the head, and the pupils are rounded; the ears are short, elliptical, and almost concealed by the fur. The skin is covered by two sorts of hair, of which one is long, rather stiff, elastic, and of a gray colour for two-thirds of its length next the base, and terminated by shining, reddish-brown points; the other is short, thick, tufted, and soft, being of different shades of silver-gray or light lead colour. The hair is shortest on the head and feet. The hind legs are longer than the fore, and are completely webbed. The tail is ten or eleven inches long, and, except the part nearest the body, is covered with hexagonal scales. The part next the body is covered with hair like that on the back. The beaver was formerly an inhabitant of Britain, but has long been extinct. It is still found in some parts of Europe, such as Norway, and in the northern parts of Asia.

BECCAFUMI, Domenico, surnamed *Mecherino*, a celebrated painter, born near Sienna in the latter half of the fifteenth century, was leading the humble life of a shepherd, and amusing himself with drawing figures on the sand, when a wealthy individual, from whom he takes the name of Beccafumi, discovered his genius, and sent him to study drawing at Sienna. He there saw, admired, and tried to imitate the paintings of Perugino; but having heard much of Raphael and Michael Angelo, he obtained means from his patron to travel to Rome. After remaining for some time to study the master-pieces of the Vatican he returned to Sienna, and enriched its churches with many noble frescoes and other paintings. He drew and coloured well, possessed strong inventive powers, was thoroughly acquainted with perspective, and excelled particularly in foreshortening, but he was not free from a kind of mannerism, and his heads are in general deficient both in dignity and beauty. He died at Sienna about the middle of the sixteenth century, and was buried with pomp in its cathedral, among some of the finest monuments of his genius.

BECCARIA, Cesare Bonesana, Marchese di, author of the well-known Treatise on Crimes and Punishments, was born at Milan in 1735 (or 1738). He was early excited, by Montesquieu's Lettres Persanes, to the cultivation of his philosophical talents, and afterwards favourably known as a philosophical writer by his memorable work full of a noble philanthropy, Dei Delitti e delle Pene (On Crimes and Punishments), 1764, and several others. With the eloquence of true feeling and a lively imagination he opposes capital punishments and the torture. This work led to the establishment of more settled and more correct principles of penal law, and contributed to excite a general horror against inhuman punishments. Beccaria was a true friend, a good son, a tender husband, and a real philanthropist. He is also known in Italy as the author of a philosophical grammar and theory of style, Ricerche intorno alla Natura dello Stilo (Milan, 1770), and of several good treatises on style, on rhetorical ornament, &c., contained in the journal Il Caffé, edited by him in conjunction with his friends Visconti, Verri, and others. A fit of apoplexy put an end to his useful life in November, 1793.

BECCARIA, Giovanni Battista, an ingenious practical philosopher, was born, 1716, at Mondovi. He went to Rome in 1732, where he studied, and afterwards taught grammar and rhetoric; at the same time he applied himself with success to mathematics. He was appointed professor of philosophy at Palermo, and afterwards at Rome. Charles Emanuel, king of Sardinia, invited him to Turin in 1748, to fill the professorship of natural philosophy at the university there. He paid much attention to the subject of electricity, and in 1735 published his Dell' Elettricismo Naturale ed Artifiziale (Turin). The experiments which this work contains on atmospherical electricity are so numerous and various, that Priestley affirmed, in his History of Electricity, that Beccaria's labours far surpassed all that had been done before and after him on this subject. He wrote many other valuable works on this subject. The most important, Dell' Elettricismo Artifiziale (1772), contains all that was then known of electricity. Franklin, who esteemed the works of Beccaria, had them translated into English. In 1759 the king employed him to measure a degree of the meridian in Piedmont. He began the measurement in 1760, together with the Abbot Canonica, and published the result in 1774. The doubts expressed by Cassini of the exactness of this measurement drew from him his Lettere d'un Italiano ad un Parigino, in which he showed the influence of the proximity of the Alps on the deviation of the pendulum. He died April 27, 1781.

BECCLES, a market town and parish, England, county Suffolk. The town, 33 miles N.N.E. from Ipswich, right bank of the Waveney, consists of several well-paved and well-lighted streets, uniting in a spacious market-place; houses in general well built; supply of water ample. It has a handsome town-hall, a jail, a custom-house, and assembly-rooms. The church, erected in the fourteenth century, is a spacious and elegant structure in the later style of English architecture, with a fine freestone tower and beautiful porch. There are, besides, chapels for Independents, Baptists, Wesleyans, and Primitive Methodists, also two free schools, one of which has ten exhibitions at Emmanuel College, Cambridge, and various charities. Beccles maintains an active carrying trade in coals and corn coastwise by the Waveney, which is navigable to Yarmouth. A good deal of malting is likewise carried on in the vicinity. Races are held annually on a fine course near the town. The environs abound in beautiful scenery. Pop. in 1871, 4818.

BECHER, John Joachim, the son of a clergyman, was born at Speyer in 1635. After having travelled and resided in various parts of Germany, Holland, Italy, Sweden, and Great Britain, investigating the mines in Cornwall and in Scotland, and having filled various offices, he died in 1682, some say in London, others in Germany. He wrote a number of works on chemistry, the chief of which is entitled Physica Subterranea. In it he expounds his views of the composition of inorganic bodies, the constituents of which, according to him, are three earthy principles, the vitrifiable, the combustible, and the mercurial. The metals consist of these three earths in different proportions, and whenever a metal is calcined the combustible and mercurial earths are expelled, and the vitrifiable earth forms the residual calx. When these principles are combined with water different salts are formed, and a fundamental acid, which exists in all the others. This theory, which is an outgrowth of that of the alchemists, was subsequently developed by Stahl, who, by means of the principle of *phlogiston*, explained not only the calcination of metals, but the phenomena of combustion in general. The phlogistic theory of combustion prevailed until the end of last century, when Lavoisier substituted for it the explanation based upon the action of oxygen. See Stahl.

BECHSTEIN, John Matthew, an eminent naturalist, born in 1757 at Waltershausen, in the principality of Gotha, studied theology for four years at Jena, but never felt himself in his element unless

when he was hunting in the fields or roaming the forest. Having at length obtained a situation as teacher of natural history and mathematics near Schepfenthal, he resolved to devote himself to his favourite pursuits, particularly ornithology, and was enabled to do so with still more effect when, in 1800, the Duke of Saxe-Meiningen made him director of the Forest Academy of Dreissigacker, in the vicinity of his capital. This academy under Bechstein's management became one of the most celebrated establishments of the kind in Germany. He died at Dreissigacker in 1822. The work on which his fame chiefly rests is The Natural History of Germany, in four vols. In this country he is best known by a short but admirable treatise on singing birds.

BECHUANAS, BETCHUANAS, or BICHUANAS, according to Bleek more correctly TCHUANAS, the name of a powerful and widely spread race of people inhabiting South Africa from the Vaal, or Yellow River, northwards and north-eastwards to the Tropic of Capricorn. They belong to the great Kaffre stem, and are in particular nearly allied to the Amakosa; their language, the Sechuana, has some affinities with the Congo. The numerous tribes into which they are divided, and among which the most important are the Makololo, Basutu, Batlapi (about Kuruman), and Bakalahari, are governed by separate chiefs, and are incessantly at war with each other, although they have at the same time made some progress in the arts of peace. Their territory is watered by the Malopo River in particular, and intersected by the Kamanni Mountain-range, which forms many beautiful valleys. It lies within the limits of the southern culture of European cereals, which the Bechuanas accordingly are partly engaged in cultivating, though they are more largely employed in cattle-breeding. Horses they have a dislike to. They also work in iron, copper, and ivory; and are skilful in tempering their iron weapons. Most of the labours of everyday life, such as the cultivation of the fields, and even the erection of a house, fall upon the women. There are few traces of religious beliefs among them; but a class of impostors, who pretend to be able to bring rain, are held in great honour. The Bechuanas live in villages and towns of considerable size, each house being surrounded by a wall or dike. The houses are all of a circular shape. The Bechuanas became known to Europeans about the beginning of the century, but our information regarding them is still imperfect. Missionaries have long been settled among them, Kuruman, or New Lattakoo, about 140 miles N. of the boundaries of the Cape Colony, having been the chief missionary station since 1816. At the same distance to the N.W. of New Lattakoo lies Kolobeng, the original station of Dr. Livingstone. Native chieftains reside in both towns.

BECK, CHRISTIAN DANIEL, born at Leipsic in 1757, qualified himself as an instructor there in 1779, became professor of Greek and Latin in 1785, of history in 1819, and of Greek and Roman literature in 1825, and continued till his death in 1832 to deliver valuable lectures on exegesis, philology, and archæology. To the duties of his chair he added those arising from numerous official appointments of a public nature, but managed, while discharging all of them with scrupulous fidelity, to find time for the composition of many important works, and the editorship of a periodical entitled A General Repertory of the Most Recent Home and Foreign Literature. His work which is probably destined to live longest, is an Introduction to a Knowledge of the History of the World and its Inhabitants, in four vols.

BECKET, THOMAS, the most celebrated Roman Catholic prelate in the English annals, was born in London 1117 or 1119. He was the son of Gilbert, a London merchant. His mother is said to have been a Saracen lady, to whose father Gilbert was prisoner in Jerusalem, having become a captive during the Crusades. The lady is said to have fallen in love with the prisoner, to have assisted him in obtaining his liberty, and afterwards to have followed him to London, where she found him by repeating the only two European words she knew, 'London' and 'Gilbert.' So runs the legend. After studying at Oxford and Paris, Becket was sent, by the favour of Theobald, archbishop of Canterbury, to study civil law at Bologna in Italy, and on his return was made Archdeacon of Canterbury and Provost of Beverley. His claim to the good opinion of Theobald was founded on his skill in negotiation shown in a matter of the highest importance to England—the soliciting from the pope the prohibitory letters against the crowning of Eustace, the son of Stephen, by which that design was defeated. This service not only raised Becket in the esteem of the archbishop, but in that of King Henry II., and was the foundation of his high fortune. In 1158 he was appointed high-chancellor and preceptor to Prince Henry, and at this time was a complete courtier, conforming in every respect to the humour of the king. He was in fact his prime companion, had the same hours of eating and going to bed, held splendid levees, and courted popular applause. In 1159 he made a campaign with the king in Toulouse, having in his own pay 700 knights and 1200 horsemen; and it is said he advised Henry to seize the person of Louis, king of France, shut up in Toulouse without an army. This counsel, however, so indicative of the future martyr, being too bold for the lay counsellors of one of the boldest monarchs of the age, was declined. In the next year he visited Paris to treat of an alliance between the eldest daughter of the King of France and Prince Henry, and returned with the young princess to England. He had not enjoyed the chancellorship more than four years when his patron Theobald died, and King Henry was so far mistaken as to raise his favourite to the primacy, on the presumption that he would aid him in those political views, in respect to church power, which all the sovereigns of the Norman line embraced, and which, in fact, caused a continual struggle until its termination by Henry VIII. It has been asserted that Becket told the king what he was to expect from him; but, independent of the appointment itself, there is evidence to prove his eagerness to obtain the dignity, and the disgust entertained by Henry at the first symptoms of the real temper of the man whom he had been so anxious to promote.

Becket was consecrated archbishop in 1162, and immediately affected an austerity of character which formed a very natural prelude to the part which he meant to play. Pope Alexander III. held a general council at Tours in 1163, at which Becket attended and made a formal complaint of the infringements by the laity on the rights and immunities of the church. On his return to England he began to act in the spirit of this representation, and to prosecute several of the nobility and others holding church possessions, whom he also proceeded to excommunicate. Henry, an able and politic monarch, was anxious to recall certain privileges of the clergy, which withdrew them from the jurisdiction of the civil courts; and it was not without a violent struggle, and the mediation of the pope, that Becket finally acquiesced. The king soon after summoned a convocation or parliament at Clarendon, to the celebrated 'constitutions' of which, although the archbishop swore that he would never assent, he at length subscribed, and alleging something like force for his excuse, by way of penance suspended himself from his archiepis-

copal functions until the pope's absolution could arrive. Finding himself the object of the king's displeasure, he soon after attempted to escape to France; but being intercepted, Henry, in a parliament at Northampton, charged him with a violation of his allegiance, and all his goods were confiscated. A suit was also commenced against him for money lent him during his chancellorship, and for the proceeds of the benefices which he had held vacant while in that capacity. In this desperate situation he with great difficulty and danger made his escape to Flanders, and, proceeding to the pope at Sens, humbly resigned his archbishopric, which was, however, restored. He then took up his abode at the Abbey of Pontigny, in Normandy, whence he issued expostulatory letters to the King and bishops of England, in which he excommunicated all violators of the prerogatives of the church, and included in the censure the principal officers of the crown. Henry was so exasperated that he banished all his relations, and obliged the Cistercians to send him away from the Abbey of Pontigny; from which he removed, on the recommendation of the King of France, to the Abbey of Columbe, and spent four years there in exile.

After much negotiation a sort of reconciliation took place in 1170, on the whole to the advantage of Becket, who, being restored to his see, with all its former privileges, behaved on the occasion with excessive haughtiness. After a triumphant entry into Canterbury the young Prince Henry, crowned during the lifetime of his father, transmitted him an order to restore the suspended and excommunicated prelates, which he refused to do, on the pretence that the pope alone could grant the favour, although the latter had lodged the instruments of censure in his hands. The prelates immediately appealed to Henry in Normandy, who in a state of extreme exasperation exclaimed, 'What an unhappy prince am I, who have not about me one man of spirit enough to rid me of a single insolent prelate, the perpetual trouble of my life!' These rash and too significant words induced four of the attendant barons, Reginald Fitz-Urse, William de Tracy, Hugh de Morville, and Richard Breto, to resolve to wipe out the king's reproach. Having laid their plans, they forthwith proceeded to Canterbury, and having formally required the archbishop to restore the suspended prelates, they returned in the evening of the same day (Dec. 29, 1170), and placing soldiers in the courtyard, rushed with their swords drawn into the cathedral, where the archbishop was at vespers, and advancing towards him threatened him with death if he still disobeyed the orders of Henry. Becket, without the least token of fear, replied that he was ready to die for the rights of the church; and magnanimously added, 'I charge you in the name of the Almighty, not to hurt any other person here, for none of them have been concerned in the late transactions.' The confederates then strove to drag him out of the church; but not being able to do so, on account of his resolute deportment, they killed him on the spot with repeated wounds, all which he endured without a groan.

The conduct of Henry, and the consequences of this assassination, form a part of English history wherein the discerning student will perceive the subtle policy of the court of Rome, which eagerly availed itself of this opportunity to advance its general object, with a due regard to the power of Henry and his strength of character. The perpetrators of the deed, on taking a voyage to Rome, were admitted to penance, and allowed to expiate their enormity in the Holy Land.

Thus perished Thomas Becket in his fifty-second year, a martyr to the cause which he espoused, and a man of unquestionable vigour of intellect. He was canonized two years after his death, and miracles abounded at his tomb. In the reign of Henry III. his body was taken up and placed in a magnificent shrine erected by Archbishop Stephen Langton; and of the popularity of the pilgrimages to his tomb the Canterbury Tales of Chaucer will prove an enduring testimony.

BECKETT, Gilbert Abbot A', a noted writer in the departments of light literature, was the son of a London solicitor in Golden Square, and was born in the year 1810. He was originally destined for the profession of a barrister, but having been left to his own resources when very young, he united himself with a band of talented friends and sought a subsistence by the labours of his pen. For many years he was connected with various satirical journals—the Cerberus, the Beacon, and others, all now forgotten, but which enjoyed a considerable circulation in the days when Punch was not. He also wrote leaders for the Herald and the Times; and having been connected with the management first of the Tottenham Court and afterwards of the St. James' theatres, produced several farces and burlesques which achieved a fair amount of success. On the establishment of Punch Mr. A'Beckett became one of its leading contributors, and many of the inimitable parodies and social caricatures which characterize the early volumes of that periodical are of his authorship. About this time he resumed his legal studies, was called to the bar, and having formed an acquaintance with Mr. Buller, the eminent statesman, was appointed member of a commission for reporting on the operation of the poor-laws, in which capacity he displayed great solidity and judgment, and furnished government with a very able report. The result of the reputation thus acquired was his nomination, in 1849, to the post of one of the metropolitan magistrates, an office which he likewise filled with great ability. In the summer of 1856 he had proceeded with his family to Boulogne-sur-Mer to enjoy his annual relaxation from magisterial duties, when he was there suddenly attacked by fever, which carried him off on the 28th of August. In addition to the works above referred to, Mr. A'Beckett was also the author of the Comic Blackstone, the Comic History of England, and the Comic History of Rome, all of which enjoyed much popularity at the time, though the taste for such productions has since then greatly declined.

BECKFORD, William, an English writer famous in his time for his immense wealth, his eccentricities, and his literary talents. He was the son of Alderman Beckford, and was born in London in 1761. In his tenth year the death of his father left him in the possession of estates which are said to have yielded him an income of more than £100,000 a year. Under the direction of Lord Chatham he received a careful education, and at an early age gave evidence of unusual abilities. His first work, a satirical essay entitled Biographical Memoirs of Extraordinary Painters, in which he ridiculed the English artists of his time, was published before he was twenty years of age. After this he spent some time in travelling over different parts of the Continent, an account of which he published half a century later with the title, Italy, with Sketches of Spain and Portugal (London, two vols. 1834). On his return to England he entered the House of Commons for a short time as member for Hindon, but he soon became tired of this career, and again withdrew to Portugal, where he bought an estate in the neighbourhood of Cintra, and where he lived in familiar intercourse with the royal family of Portugal. After

the lapse of some years he appeared again in England, and began in 1796 to erect a splendid edifice upon his estate of Fonthill, which he furnished with more than royal luxury, and continually enlarged with new buildings. Here he resided till 1822, when, owing to the loss of two large estates, which had been successfully claimed in Chancery by other owners, he was obliged to sell Fonthill for £330,000. He then settled at Bath, where he began to occupy himself anew with building and collecting works of art. He died at Bath May 2d, 1844. His literary fame rests upon his eastern tale Vathek, which he wrote in French, and published at Lausanne in 1784, and a translation of which into English appeared at London without his knowledge in 1786. The tale is still much read, and upon Byron it made a great impression. He says of it:—'For correctness of costume, beauty of description, and power of imagination, this most eastern and sublime tale far surpasses all European imitations; and bears such marks of originality, that those who have visited the East will have some difficulty in believing it to be more than a translation.'

BECKMANN, JOHN, for almost forty-five years professor of philosophy and economy in Göttingen, was born at Hoya in 1739. In 1763 he was appointed professor of the Lutheran gymnasium in St. Petersburg. In 1766 he became professor in Göttingen, where he lectured with great success. Beckmann died in 1811, being a member of most of the learned societies of the north of Europe. There are a number of text-books, in the different sciences above-mentioned, by him. Among his other works is a History of Inventions (Leipzig, 1780–1805, five vols.)

BECSKEREK, two towns, Hungary, Banat.—1. BECSKEREK NAGY, or GREAT BECSKEREK, province of Thither Theiss, county Torontal, capital of the district of same name, on left bank of the Bega, 45 miles S.W. from Temesvar, with which it communicates by the Bega Canal. It possesses important privileges as a market town, is the seat of several district offices, and contains a Roman Catholic (parish) and a Greek Non-united church. Pop. 20,000.—— 2. BECSKEREK KIS, or LITTLE BECSKEREK, county Temes, and 10 miles N.W. from Temesvar. It is inhabited by Germans and Wallachians. The former have a Roman Catholic and the latter a Greek Non-united church. Pop. 3263.

BED, in gunnery, the frame of timber or planks in which cannon, mortars, &c., are placed, to give them a steady and even position, necessary for aiming.

BEDA, or BEDE, an eminent ecclesiastic of the eighth century, usually called the *Venerable Bede*, was born in the year 672 or 673, in the neighbourhood of Wearmouth, in the bishopric of Durham. From the age of seven to that of nineteen he pursued his studies in the monastery of St. Peter, at Wearmouth. Being then ordained deacon, he was employed in the task of educating the youth who resorted to the monastery for instruction, and pursued his own studies with unremitting ardour. In his thirtieth year he was ordained priest; and his fame for zeal and erudition reaching the ears of Pope Sergius, he was invited to Rome, but in consequence of the death of that pontiff never went there. It is not even certain that he ever left Northumberland, which of course reduces the incidents of his life to his literary pursuits and domestic occupations, as he accepted no benefice, and never seems to have interfered in civil transactions. His church history was completed in 731. His last literary labour was a translation of the Gospel of St. John into Saxon, which he completed, with difficulty, on the very day and hour of his death. The manner of the death of this virtuous ecclesiastic was striking and characteristic. He was dictating his translation of the Gospel of St. John to an amanuensis. The young man who wrote for him said, 'There is now, master, but one sentence wanting;' upon which he bade him write quickly; and when the scribe said, 'It is now done,' the dying sage ejaculated, 'It *is* now done,' and a few minutes afterwards expired in the act of prayer on the floor of his cell, in the sixty-third year of his age, in the month of May, A.D. 735.

The writings of Bede were numerous and important, considering the time in which they were written and the subjects of which they treat, which extended to ecclesiastical affairs, religion, and education. His Ecclesiastical History of England, Historia Ecclesiastica Gentis Anglorum, is the greatest and most popular of his works, and has acquired additional celebrity by the translation of King Alfred. The collections which he made for it were the labour of many years. Besides his own personal investigations he kept up a correspondence with the monasteries throughout the heptarchy, to obtain archives and records for his purpose; and thus nearly all the knowledge possessed of the early state of Christianity in his country is due to Bede. There have been several editions of the original Latin, which is easy, although not elegant. Probably the best editions are those of Dr. Smith (Cambridge, 1722), Stevenson (London, 1838), Dr. Hussey (Oxford, 1846), and that in Giles's complete edition of his works (London, six vols. 1843–44). The earliest translation of the history into English is that of Thomas Stapylton, D.D. (Antwerp, 1565), besides the Anglo-Saxon version of Alfred. Bede was also the author of many other works, a catalogue of which he subjoined to his history. Several of these were printed early; but the first general collection of his works was that of Paris, 1544, three vols. fol. Another edition in eight vols. was published at the same place in 1554, and others were subsequently published at Basel and Cologne. While the number and variety of the writings of Bede show the extent of his erudition, his probity, moderation, and modesty insured him general respect; and his disinterestedness is proved by the fact that he was never anything but an unbeneficed priest. A letter of advice which he wrote late in life to Egbert, archbishop of York, proves at once the purity of his morals, the liberality of his sentiments, and the excellence of his discernment; his wish being to curtail the number of monasteries, and to increase the efficacy and respectability of the secular clergy. Notwithstanding the veneration with which he was regarded, not a single miracle is recorded of him; and as monks were the great miracle-mongers, and his views of monastic reform such as we have mentioned, this is not surprising.

BEDARIEUX, a town, France, department Herault, 18 miles N. from Beziers, agreeably situated on the left bank of the Orb, which separates it from one of its suburbs. It is well built, the streets conveniently laid out, and is one of the busiest and most thriving commercial and manufacturing towns of the same size in France. It has manufactures of fine and common cloth, woollen stuffs, and floss silk, worsted and cotton stockings, hats, soap, olive-oil; tanneries, dye-works, paper and glass works, and a brass foundry. It has also a trade in wine and brandy. Pop. 9000.

BEDDOES, THOMAS, a physician and author, born 1760 at Shiffnal in Shropshire; died 1808. He was educated by his grandfather. He made great progress at school in classical studies, and distinguished himself at Oxford by his knowledge of ancient and modern languages and literature. The

great discoveries in physics, chemistry, and physiology irresistibly attracted him. He continued his studies with success in London and Edinburgh. In his twenty-sixth year he took his doctor's degree, afterwards visited Paris, and formed an acquaintance with Lavoisier. On his return he was appointed professor of chemistry at Oxford. There he published some excellent chemical treatises, and Observations on the Calculus, Sea-scurvy, Consumption, Catarrh, and Fever. But, dazzled by the splendid promises of the French revolution, he offended some of his former admirers, and excited such a clamour against him by the publication of his political opinions, that he determined to resign his professorship, and retired to the house of his friend Mr. Reynolds, in Shropshire. There he composed his Observations on the Nature of Demonstrative Evidence, in which he endeavours to prove that mathematical reasoning proceeds on the evidence of the senses, and that geometry is founded on experiment. He also published the History of Isaac Jenkins, which was intended to impress useful moral lessons on the labouring classes in an attractive manner. Above 40,000 copies of this popular work were sold in a short time. After he had married, in 1794, he formed the plan of a pneumatic institution, for curing diseases, particularly consumption, by means of factitious airs or gases. He succeeded, with the assistance of the celebrated Wedgewood, in opening this institution in 1798. He engaged as superintendent of the whole, young Humphry Davy, the foundation of whose future fame was laid here. The chief purpose of the institution, however, was never realized, and Beddoes' zeal gradually relaxed, so that he relinquished it one year before his death, after having published a number of valuable works upon the application of factitious airs. In the last years of his life he acquired the reputation of the best medical writer in Great Britain, particularly by his Hygeia, in three vols., a popular work which contains passages of extraordinary eloquence. His political pamphlets fom 1795–97 are forgotten.

BEDELL, WILLIAM, a celebrated Irish bishop, born at Black Notley in Essex in 1570, studied at Cambridge, became minister of St. Edmundsbury in Suffolk, and in 1604 went to Venice as chaplain to the ambassador, Sir Henry Wotton. Here he remained for eight years, and became intimately acquainted with the celebrated Fra Paolo Sarpi, who taught him Italian, and was taught theology in return. While here Bedell translated the English Prayer-book into Italian. On his return to England Bedell resumed the duties of his curacy, but left it in 1615 for the living of Horingsheath. Here he remained for twelve years, and quitted it to become provost of Trinity College, Dublin, a situation which he would have declined had not the king expressly commanded his acceptance of it. The wisdom of this choice was soon justified by the important reforms which Bedell undertook and successfully accomplished, through the admirable manner in which he tempered firmness with prudence. In 1629 he was appointed to the united sees of Kilmore and Ardagh. Both sees had been much dilapidated, and their united revenues afforded a scanty subsistence, but with the same disinterested zeal which had marked him through life, thinking the duties of one sufficient, he retained only Kilmore, and insisted on resigning Ardagh. He now turned his attention to the Roman Catholics, and without evincing anything of a persecuting spirit, laboured assiduously to convert them to Protestantism, and with such success as makes it almost certain that if his efforts had been duly seconded in other dioceses, Ireland would long since have been delivered from its worst evil by the complete overthrow of the Papal ascendency. He caused the Prayer-book to be translated into Irish, and read regularly every Sunday in the cathedral. The New Testament had already been translated, but Bedell had the honour of perfecting the boon by procuring the translation of the Old Testament. In 1641, on the breaking out of the rebellion, his house was for some time the only English one in the county of Cavan which remained uninjured; but at last he was so far involved in the common fate that he was carried off to the castle of Cloughboughter, where he was imprisoned with many others, the only exception in his favour being that he was not put in irons. He had now reached the verge of human life, and though no actual violence was done to his person, the sufferings endured by his friends, and the apparent annihilation of all which he had done for his church, weighing heavily on his spirits, he sickened and died in 1642, in his seventy-first year. The duties of the important stations which he occupied left him little time for literary labours, and his works accordingly are few and of comparatively little importance. His biography has been written by Bishop Burnet.

BEDFORD, JOHN, DUKE OF, one of the younger sons of Henry IV., king of England; famous as a statesman and a warrior. Shakspeare, who calls him *Prince John of Lancaster*, introduces him in his plays of Henry IV. as distinguishing himself by his youthful courage in the battle of Shrewsbury in 1403, and forming a kind of moral contrast to his more dissipated brother the Prince of Wales. During the reign of Henry V., he participated in the fame acquired by the conquest of France; but his talents were fully displayed when, after the death of that king, he became Regent of France, having been appointed to this post by Henry in his will. At Verneuil, in 1424, he displayed his military talents; and the difficulties which from various causes he experienced in endeavouring to maintain possession of the conquered provinces in France afforded frequent occasion for the manifestation of his ability. The greatest blemish in his character is his cruel execution of the Maid of Orleans in 1431. He survived this event about four years, and dying in 1435 at Rouen, was buried in the cathedral of that city. The duke deserves notice also for his patronage of the arts. A curious monument of his taste still exists—the Bedford Missal, a book made for him and his duchess. This rich volume is 11 inches long, 7½ broad, and 2½ thick, bound in crimson velvet, with gold clasps, on which are engraved the arms of Harley, Cavendish, and Hollis, quarterly. It is embellished with fifty-nine large miniature paintings, with more than a thousand of a small size; and among them are to be seen several portraits of persons of eminence. It was purchased by Edward Harley, earl of Oxford, from Lady Worsley, great-grand-daughter to W. Seymour, second duke of Somerset, who figured in the reign of Charles I.; and descended from Lord Oxford to his daughter, the Duchess of Portland. In the year 1786, when the collection of the duchess was brought to sale, it was purchased by a Mr. Edwards for 215 guineas, and was sold again at the sale of the collection of that gentleman, in the year 1815, when it brought £687, 15s., and came into the possession of the Duke of Marlborough. On coming to the hammer once more it attracted strongly the attention of book-collectors and antiquaries, and realized the unprecedented sum of £1100, being sold at that price (June, 1833) to Sir John Tobyn, of Liverpool. It is now lodged in the collection of the British Museum. In an historical point of view it is interesting on account of its pictorial embellishments, some of which have been engraved by Vertue for his portraits to illustrate the History of England.

For the antiquarian and the student of the fine arts it is one of the most interesting monuments of that age. Gough the antiquarian published a work in 8vo describing the Bedford Missal. Mr. Dibdin, in his Bibliomania, p. 253, gives an account of it.

BEDFORD, an inland county, England, capital Bedford, bounded N.W. by Northampton, W. by Bucks, S. by the latter county and Herts, E. by the latter and Cambridge, and N.E. by Huntingdon; area, 296,320 acres, of which about 250,000 are arable, meadow, and pasture. The surface is pleasingly diversified by hill and valley, and presents every variety of soil; but, on the whole, of about an average fertility. Chalk hills, forming a portion of the Chilterns, cross it on the S.; N. of this is a belt of sand, varying from 1 mile to 5 miles in breadth, and extending from Leighton-Buzzard, on the S.W. border of the county, to Potton, on the N.E., particularly well suited for horticultural purposes, and for the turnip husbandry. The vale of Bedford, the soil of which consists mostly of clay and loam, is very fertile; and the meadows on the margin of the Ouse and other streams are verdant and luxuriant, from frequent overflowings. The land is chiefly under tillage, and agriculture is in some districts in a very advanced state. On the sandy and chalky soils culinary vegetables are extensively cultivated for the London, Cambridge, and other markets. The onions produced here are reckoned little inferior to the Spanish; and the cucumbers, which are raised in great quantities in the open air, are much esteemed. On the clays, beans and wheat are the principal produce; on the light soils, turnips, barley, seeds, and wheat usually follow each other; on the loams, beans or pease are generally sown after wheat. Steam cultivation is becoming general. The drill is in extensive use, and a good deal of wheat is dibbled. Cattle and sheep of the highest breeds. The flocks of Leicester and Oxford Down sheep and the herds of shorthorns have of late years attained great celebrity in home and foreign exhibitions. Average size of farms about 150 acres, mostly held from year to year; average rent of land, 25*s.* 5*d.* per acre. The Ouse, with an exceedingly winding course W. to E., intersects the county; besides which it is watered by the Ivel and some smaller affluents of the Ouse.. Principal manufacture:—agricultural implements and straw-plait for hats, reckoned inferior only to that brought from Tuscany. The county is divided into nine hundreds and 124 parishes. It returns four members to the House of Commons; namely, two for the county, and two for the borough of Bedford. Pop. in 1861, 135,287; in 1871, 146,256.

BEDFORD, a borough and market town England, capital of Bedfordshire, 46 miles N.N.W. London; pleasantly situated on both banks of the Ouse, which is here crossed by a handsome stone bridge of five arches. The streets, the principal one of which is about 1¼ mile long, are open, clean, and lighted with gas. In the part called New Town, on the N.W., there are several new terraces and rows of handsome houses. It has a complete system of sewerage and water supply, and the sewage is utilized with profit in the irrigation of land. The principal buildings are the five parish churches, one supplementary district church in the large parish of St. Paul, a range of public schools in the late Tudor style; a large infirmary, and an elegant and spacious chapel, built by the church and congregation over which Bunyan was pastor. There are also new gas-works, militia barracks, the Britannia ironworks, public assembly-rooms, a sessions-house, a subscription library, and a handsome corn-exchange. The principal feature of the town is 'the Bedford Charity,' founded by Sir W. Harpur in 1561, which comprises the ancient grammar-school, a commercial and preparatory school, a girls' and infant schools; educating altogether, without cost to the parents, about 2000 children, besides supporting alms-houses, &c. Connected with the grammar-school there are eight exhibitions, of £80 each, to Oxford, Cambridge, London, Durham, or Dublin, tenable for four years, and two prize premiums of £200 each, awarded annually to the head boys of the commercial school. The revenue of this establishment is upwards of £13,000 per annum. The public free schools attract large numbers of residents. There was once a large trade done in Bedford in pillow-lace, the manufacture of which employed most of the poor female inhabitants; but this trade has been all but destroyed by the introduction of machinery; and there is now no staple trade in the town. Two extensive manufactories of agricultural implements are successfully carried on, employing about 600 hands. Bedford has given birth to no very eminent men, but is intimately associated with two imperishable names—Bunyan and Howard. John Bunyan was born at Elstow, a village situate 1 mile S. of the town. It was at Bedford, however, that he lived, preached, and was imprisoned. There are several relics of Bunyan in the town, the principal of which are, his chair in the vestry of the chapel, and the copy of Fox's Book of Martyrs which he read in prison. The latter is in the county subscription library. It is in two vols. fol., black-letter, and has Bunyan's autograph in each of the titles, and several verses in his handwriting scattered over the book. John Howard lived at Cardington, 2 miles S.E. the town. Bedford has railway communication with all parts of the kingdom by the Midland main line, and by branch lines of the London and North-western Railway. A fine cemetery of 18 acres is laid out on the sloping hill to the N.E. of the town. About a mile S.W. the town is the Bedfordshire Middle-class College, a handsome new building attended by about 200 boys. Pop. in 1861, 13,413; in 1871, 16,849.

BEDFORD LEVEL, a large tract of low-lying land in England, comprising about 400,000 acres in counties Cambridge, Norfolk, Suffolk, Huntingdon, Northampton, and Lincoln, formerly full of fens and marches, and in rainy seasons for the most part under water. Peterborough Fen, which is that part of the Level running into Northamptonshire, and extending between Peterborough and Crowland, contains between 6000 and 7000 acres. One-seventh part of the level is situated in Huntingdonshire. Nearly the whole of the Isle of Ely, which forms the N. division of Cambridgeshire, consists of this marshy ground. The S.E. part of Lincolnshire, usually termed Holland, extending to the river Witham on the N., is also included in the Bedford Level. 63,000 acres are situated in Norfolk, and 30,000 in Suffolk. It derives its name from Francis, earl of Bedford, who in the seventeenth century expended large sums of money in attempting to drain this fenny district. There is sufficient evidence to show that this part of the country was formerly dry land, at a much lower level than the present surface, which is formed by sedimentary depositions. Various expedients have been had recourse to for the purpose of draining these marshes. Numerous cuts have been made, intersecting every part. Some of these are so large and deep as to serve for navigable canals. In the Isle of Ely, the Old and New Bedford rivers are two cuts, running nearly parallel to each other. These are both navigable for upwards of 20 miles. In various places wind-mills have been erected, which raise the water to the requisite height to admit of its being conveyed to receptacles sufficiently elevated by which it may be carried off to its proper channel, and steam-engines are also used for the same purpose; but the expense incurred

in draining has sometimes exceeded greatly the value of the land reclaimed. In Huntingdonshire, about the latter end of the last century, the tax raised on the land by the conservators for its drainage and the preserving of its embankments, was in some instances so great that the farmers preferred forfeiting their land to paying so exorbitantly for its preservation. In the present day the art of drainage is better understood than when this stupendous work was first undertaken; and the great cuts and embankments constructed in recent years have rendered the drainage now tolerably effective. In 1795 an act was passed for improving the outfall of the river Ouse, and for making a cut across the marshes from Eau Brink to Lynn; but it was not till 1818 that this important work was commenced. It was completed in about two years, and has proved highly serviceable. Another great work is the Middle Level Drain, completed in 1853 at a cost of more than £400,000. A great part of the Level is under cultivation, and produces grain, flax, and cole-seed in considerable quantities; but there is still sufficient fenny land to yield a rich harvest of wild fowl in winter for the London market.

BEDMAR, Alphonso de la Cueva, cardinal, born in 1572 of one of the oldest families in Castile, was sent in 1607 by Philip III. as ambassador to Venice, and rendered himself famous by the conspiracy against Venice which St. Real has so well described. According to his account, Bedmar, one of the most subtle intellects and dangerous spirits which Spain has produced, leagued in 1618 with Don Pedro of Toledo, governor of Milan, and the Duke of Ossuna, viceroy of Naples, to overthrow the republic and subject it to Spanish domination. The plan was to foment internal dissensions, introduce men devoted to Spain into the Venetian service, and when all was prepared to set fire to the arsenal and massacre the senate, while troops, brought partly by sea and partly from Milan by land, should force their way into the city and make themselves masters of it during the confusion. The plot was discovered, and great numbers of persons, said to be accomplices of Bedmar, were executed. Notwithstanding the circumstantiality with which the details are given, the very existence of the conspiracy is still considered by many a very difficult historical problem, and St. Real is said to have borrowed more from his imagination than from fact. The probability is that the conspiracy was real, but that the senate, satisfied with having discovered it, and not willing to break altogether with Spain, did not think it advisable to give it much publicity. Bedmar had been obliged to save himself by flight to avoid the fury of the populace, but he did not lose the favour either of his own sovereign or of the pope. By the former he was appointed governor of the Low Countries, where his tyranny and bigotry made him universally detested; and from the latter he received a cardinal's hat. He died in 1655, in his eighty-third year.

BED OF JUSTICE. See Lit de Justice.

BEDOUINS, or Bedoweens (that is, *inhabitants of the desert*), a numerous Mohammedan race, which dwells chiefly in the deserts of Arabia, Egypt, and Northern Africa. It is still doubtful whether they belong to the same race with the Arabs or differ from them in their descent, as they do in their manner of living. The Bedouins live at a distance from cities and villages, in families under sheiks or in tribes under emirs. Their dwellings are tents, huts, caverns, and ruins. With their herds and beasts of burden, which carry their little property, they wander in quest of fresh water and pasture. They are all good horsemen, and are generally fond of hunting. The peaceful tribes exchange horses (which they raise with great care) and fat cattle for arms and cloth with the neighbouring nations. Other hordes are such open robbers that it is dangerous to travel through their country without a guard or a passport, which the different chiefs sell. They not only plunder, but murder, even when the travellers offer no resistance. Notwithstanding this barbarous custom the Bedouins hold the rights of hospitality sacred, and the most defenceless enemy is sure of their protection if they have once allowed him shelter. But the Bedouin considers every one his enemy who is not his brother, kinsman, or ally. Always careful of his own safety, he attacks no caravan or camp without being sure of his superiority. To superior numbers and a bold resistance he yields, and saves himself by a speedy flight. A terror to the neighbouring nations, the rapacious Bedouin lives in a state of continual watchfulness; poor, ignorant, wild, and rude, but free, and proud of his liberty. This people is remarkable for temperance in regard to food, amounting almost to abstinence. See Berbers.

BEDWIN, Great and Little, a market town and village, England, county Wilts. Great Bedwin lies on a plain surrounded by forest and woodland, 7 miles S.E. of Marlborough; consists chiefly of one main street, straight and well kept; houses brick, and mostly old; water abundant. It has a church, a plain, ancient structure, with a square tower; two chapels; a town-hall built over the market-house; a school for poor children established by the Marquis of Aylesbury. The town has a little trade in coals, timber, &c., by the Kennet and Avon Canal, which passes through it; and some business also is done in malting. Pop. 2263. Little Bedwin is situated about 1¾ mile N.N.E. of the former; it contains a neat little church, and has a pop. of 496.

BEE (*Apis*), the common name given to a large family (Apiaria) of hymenopterous insects, which comprehends a great number of genera and species. There are about 250 species of bees found in Great Britain, the most important of which is, of course, the common hive or honey bee (*Apis mellifica*). The honey-bee is universally celebrated for its singular instincts, and highly prized for the valuable products of its industry. A vast number of interesting facts have consequently been collected in relation to the economy of the species, for the detail of whose history a volume of considerable size would be required. We shall therefore be able to present nothing more than a sketch of the most striking generalities, obtained from the admirable works of Huber, Cuvier, &c., and to these authentic sources must refer the reader desirous of more ample information.

Three sorts of individuals are found to form a community of honey-bees; the female, mother, or, as she is commonly called, *queen;* the males or drones; and the working bees, improperly termed *neuters*, as they are actually females, though, in a peculiar respect, imperfect. A hive commonly consists of one mother, or queen, from 600 to 800 males, and from 15,000 to 20,000 working bees. The last-mentioned are the smallest, have twelve joints to their *antennæ*, and six abdominal rings: the first joint or square portion of the posterior *tarsi* is enlarged at the posterior angle of its base, and shaped like a pointed auricle, having its internal surface covered with a fine, short, close, silky down. They are provided with stings. The mandibles are spoon-shaped, and not dentated. There is, on the outside of the hind-legs, a smooth hollow, edged with hairs, called the *basket:* the silky brush of the first joint of the posterior *tarsi* has seven or eight transverse *striæ*. The mother, or queen, has the same characteristics, but is of larger size, especially in the abdomen: she has a shorter sucker or trunk, and the mandibles grooved and velvet-like

beneath the tip. The males, or drones, differ from both the preceding by having thirteen joints to the *antennæ;* a rounded head, with larger eyes, elongated and united at the summit; smaller and more velvety mandibles, and shorter anterior feet, the two first of which are arched. They have no auricular dilatation nor silky brush on the square part of the posterior *tarsi*, and are destitute of stings. The reproductive system has been minutely investigated, but does not seem to require any minute description.

When we examine the internal structure of this insect we find at the superior base of the trunk or sucker, below the *labrum*, a considerable aperture, shut by a small triangular piece, which has been called *tongue*, *epipharynx*, &c. This opening receives the food, which is thence conveyed by a delicate *œsophagus*, through the corselet, to the anterior stomach, which contains the honey; the second stomach receives the pollen of flowers, and has on its internal surface a number of transverse and annular wrinkles. The abdominal cavity of the queen and working bees also contains the little bag of poison communicating with the sting. In the queen there are, moreover, two large ovaries, consisting of a great number of small cavities, each containing sixteen or seventeen eggs. These ovaries open near the anus, previous to which they dilate into pouches, where the egg is delayed to receive a viscous coating from an adjacent gland. The inferior half-circles, except the first and last, on the abdomens of working bees, have each on their inner surface two cavities, where the wax is formed in layers, and comes out from between the abdominal rings. Below these cavities is a particular membrane, formed of a very small hexagonally-meshed network, which is connected with the membrane lining the walls of the abdominal cavity.

Wax, of which the combs are formed, is elaborated from honey. The pollen collected from flowers, mixed with a small quantity of wax, constitutes the food of bees and their larvæ; and this food appears to be modified in its composition according to the sort of individuals it is intended for. Another substance collected by bees from the opening buds of poplar and other trees, and used by them for lining their hives, stopping holes, &c., is called *propolis*.

Besides the distinctions remarked in the female, male, and working bees, Huber regards the working bees as of two sorts; one devoted to the collection of provisions, and all the materials necessary to the comb, as well as to its construction; these he calls *cirières*. The others are more delicate, small, and feeble, and employed exclusively within the hive, in feeding and taking care of the young.

The resemblance existing between the working and female bees first led to the idea that they were of the same sex, and the ingenious experiments and accurate observations of Huber enabled him to establish this fact in the most satisfactory manner. Having deprived a hive of the mother or queen, he found that the working bees immediately began to prepare a larva of their own class to occupy this important station. This was effected by enlarging the cell to the dimensions of a maternal or royal chamber, and feeding the selected individual on food exclusively destined for the nourishment of the royal larvæ. If merely fed upon this food, without an accompanying enlargement of the cell, the maternal faculties were but imperfectly acquired, as the female did not attain the proper size, and was incapable of laying any eggs but those which produced males.

The season of fecundation occurs about the beginning of summer, and the meeting between the females and males takes place high in the air, whence the female returns with the sexual parts of the male attached to the extremity of the abdomen. This one fecundation is thought to be sufficient to vivify the eggs which the mother may lay in the course of two years. The laying begins immediately afterwards, and continues until autumn. Réaumur states that the female in the spring lays as many as 12,000 eggs in the lapse of twenty-four days. Each sort of egg is deposited in the appropriate cell, unless a sufficient number of cells have not been prepared: in this case she places several eggs in one, and leaves to the working bees the task of subsequently arranging them. The eggs laid at the commencement of fine weather all belong to the working sort, and hatch at the end of four days. The larvæ are regularly fed by the workers for six or seven days, when they are inclosed in their cell, spin a cocoon, and become nymphs, and in about twelve days acquire their perfect state. The cells are then immediately fitted up for the reception of new eggs. The eggs for producing males are laid two months later, and those for the females immediately afterwards. This succession of generations forms so many particular communities, which, when increased beyond a certain degree, leave the parent hive to found a new colony elsewhere. Three or four swarms sometimes leave a hive in a season. A good swarm is said to weigh at least six or eight pounds. The life of the bee, like that of all the other insects of its class, does not continue long after the great business of providing for the continuance of the species is completed.

The cells of the comb compose two opposite ranges of horizontal hexagons, with pyramidal bases; each layer of the comb is perpendicular, and attached by the summit, and separated from the rest by a space sufficient for the bees to pass in and out. The comb is always built from above downward. The cells, with the exception of those for the female larva and nymph, are nearly of equal size, some containing the progeny, and others the honey and pollen of flowers. Some honey cells are left open, others are closed for future use by a flat or slightly convex covering of wax. The maternal or regal cells vary from two to forty in number, are greatly superior in size, nearly cylindrical, and somewhat larger at the extremity. They have small cavities on the outside, and commonly depend from the comb like stalactites, so that the larva has its head downwards.

The history of the honey-bee, as already stated, is too extensive to allow us to attempt more than this brief sketch. But to such as have leisure, and are desirous of instructive amusement, we know of no study which promises a greater degree of satisfaction; and there is no book better adapted for this purpose than the excellent treatise of Huber, which may almost be regarded as the *ne plus ultra* of its kind. A beautiful little poem, called The Bees, written by the Florentine Giovanni Rucellai, appeared in 1539.

The humble-bees, of which there are about forty species belonging to Britain, belong to the genus Bombus. The principal species found in this country are the common humble-bee (*Bombus terrestris*), black, with the hinder part of its abdomen white; the black and red bee (*B. lapidarius*); the yellow and orange bee (*B. muscorum*), called in Scotland the *foggy* bee. In the habits of all these bees, though they accumulate a store of honey, there are circumstances which render their domestication almost impossible. The course of their life through the summer is as follows:—One bee alone having survived the rigours of winter, generally sets to work, about the early part of June, to construct a nest for herself and her progeny. These nests are of different kinds, according to the habits of the insect, some of them, as the humble-bee, going deep into the earth in dry banks, others preferring heaps of stone or gravel, and the

brown, foggy, or moss bee, choosing always some bed of dry moss, generally of the long interwoven kinds called Hypnum. The nest, as first constructed, is of small dimensions within; but when the bee has deposited her eggs, and the young begin to be hatched, they all labour in common, and soon produce more ample accommodations. The cells which we find in these nests are not the work of the old bee, but are formed by the young insects in the same manner as the cocoons of silkworms; and when the perfect insect is released from them by the old bee, which the latter does by gnawing off their tops, they are then employed as honey-cups. The honey which is here deposited is not, however, intended as a store for winter: it is intended solely to meet the wants of the growing colony in rearing its young bees, which are fed on a mixed food of honey and pollen dust from the flowers of plants, while they are in the caterpillar state. The wants of the young go on increasing for a great part of the summer, and the quantity of honey they consume is very large; towards the middle or latter part of September, however, the energy of the bees begins to wax fainter, and little further progress is made in adding to the colony, or in collecting honey. Cold and showery days begin, even by this time, to thin the number of the insect population, who are now seen creeping slowly with damp and heavy wings upon the stalks and petals of flowers, where they were formerly seen actively buzzing about in search of honey. The stores of the honey-cups have not outlasted the wants of the young unfledged bees, of which they were the proper food; and if the nests be examined now, these cups are quite empty. The bees which survive the accidents of rain, cold, and frost (for they are now frequently overtaken by frosty nights in their languid journey homeward) by degrees forsake the nest and its furniture, leaving the latter as a prey to mice, beetles, or other animals. To shelter themselves for the winter they seek out some dry bank (not preferring one exposed to the sun), where they penetrate to the depth of 18 inches or 2 feet into the earth, pushing up the earth behind them, and leaving no visible track by which they have descended. In these situations they are often found by labourers and others in digging the earth, and such people are often greatly puzzled to understand how the insect can have reached such a depth. Persons who have attended to the habits of wild bees can often fix on the spots where they have taken refuge, digging for and finding them with the greatest certainty. The experiment of domesticating the different kinds of wild bees has been tried, and it was found that by removing their nest cautiously in an evening, and placing it in a quiet situation in a garden or other place where they could be observed, they went on with their works without apparent alarm or interruption. During the whole summer they continued to prosecute their occupations with the same industry as other bees; but about September, as we have mentioned, the hive began to turn languid, and the numbers which appeared going and coming about the entrance became daily smaller. It was imagined they had taken refuge within the hive, but when this was opened, after all seemed to have ceased their labours, everything was found empty and deserted; there were neither bees nor honey; the stronger and younger insects having gone, no doubt, to make burrows for themselves in the earth, and the older ones having gradually fallen victims to the accidents of approaching winter.

BEECH. The beech (*Fagus sylvatica*), one of our handsomest forest-trees, is known by its waved and somewhat oval leaves, and its triangular fruit, consisting of three cells, and inclosed, by pairs, in a husk, which is covered with simple prickles.—Beech woods, it has been observed, are peculiarly dry and pleasant to walk in, and, under their shade, afford to the botanist many interesting plants, such as the bird's-nest (*Monotropa*), winter-green (*Pyrola*), and some rare Orchideæ. Beech-trees bear lopping well, and may be trained so as to form lofty hedges, which are valuable for shelter, since the leaves, though faded, remain through the winter, and the twisted branches may be formed into a very strong fence. The wood is hard and brittle, and if exposed to the air is liable soon to decay. It is, however, peculiarly useful to cabinet-makers and turners: carpenters' planes, &c., are made of it. Split into thin layers, it has been used to make scabbards for swords. Chairs, bedsteads, and other furniture, are occasionally formed of beech. The fruit of this tree, which has the name of *beech-mast*, and falls in September, is very palatable, but if eaten in great quantity, it occasions giddiness and headaches; still, however, when dried and powdered, it may be made into a wholesome bread. The inhabitants of Scio, one of the Ægean Islands, were once enabled to endure a memorable siege by the beech-mast which their island supplied. This fruit has occasionally been roasted, and used as a substitute for coffee. When subjected to pressure it yields a sweet and palatable oil, which is equal in quality to the best olive-oil, and has the advantage of continuing longer than that without becoming rancid. Beech-oil is manufactured in several parts of France, and is used by the lower classes of Silesia instead of butter. The cakes which remain after the oil is extracted are a wholesome food, and may be also advantageously employed for the fattening of swine, poultry, and oxen. In some countries the leaves of the beech-tree are collected in the autumn, before they have been injured by the frosts, and are used instead of feathers for beds; and mattresses formed of them are said to be preferable to those either of straw or chaff.

BEECHEY, Admiral Frederick William, was the son of Sir William Beechey the painter, and born in London in 1796. He entered the navy at the age of ten, and in 1811 was present in an engagement off Madagascar, in which three French frigates were captured. In 1818 he accompanied Lieutenant (afterwards Sir John) Franklin in an expedition to discover the north-west passage, and the following year took part in a similar enterprise with Captain Parry. In 1821 he was commissioned, with his brother H. W. Beechey, to examine by land the coasts of North Africa from Tripoli eastward, an account of which expedition appeared in 1828, under the title of Proceedings of the Expedition to Explore the Northern Coast of Africa from Tripoli Eastward, in 1821 and 1822. During the years from 1825 to 1828 he was engaged as commander of the *Blossom* in another Arctic expedition, by way of the Pacific and Behring's Strait. Of this he published an account in 1831 under the title, Narrative of a Voyage to the Pacific and Behring's Strait, and subsequently a description of the botany and zoology of the regions visited. In 1854 Captain Beechey was raised to the rank of rear-admiral of the blue, and two years afterwards died, on Nov. 28, 1856.

BEECHEY, Sir William, an eminent portrait-painter, born at Burford in Oxfordshire in 1753, entered a conveyancer's office, but soon abandoned it, and determined to make painting his profession. In 1772 he was admitted to the Royal Academy. A large equestrian picture of George III. secured his election as a Royal Academician, and procured him the honour of knighthood. He was afterwards constantly and lucratively employed. He died in

1839, at the advanced age of eighty-six. His attitudes and expression are generally good, but marks of carelessness are apparent in some of his latest pictures.

BEEF-EATERS (a corruption from the French *buffetiers*, from *buffet*, sideboard) are yeomen of the guard of the sovereign of Great Britain. They are stationed by the sideboard at great royal dinners. There are now one hundred in service, and seventy supernumeraries. They are dressed after the fashion of the time of Henry VII.

BEEF-TEA, a nourishing beverage for invalids which is prepared in a variety of ways. One way is as follows:—A pound of the lean part of beef beaten with a roller and cut into very thin slices is put into a quart of water, it is then boiled for about ten minutes, after which a few black pepper-corns are added, and some allspice-berries, and boiled for another ten minutes along with the meat. Any fat that has risen to the top is then skimmed off, and the tea is ready for use. Professor Liebig gives the following directions:—Take one pound of beef free from fat, mince it very small, add to it its own weight of water, and after digestion and agitation in the cold for about half an hour, heat it slowly to boiling. When it has boiled for a minute or two strain it through a cloth. It may be coloured with roasted onion or burned sugar, and spiced and salted to taste.

BEEJAPOOR. See BEJAPOOR.

BEELZEBUB (in Hebrew, *the god of flies*), an idol of the Moabites or Syrians. This term is applied in the Scriptures to the chief of the evil spirits. We must remember what a terrible torment insects often are in the East, in order to conceive how this name came to be given to one of the greatest of the imaginary spirits of evil. We find that almost all nations who believe in evil spirits represent them as the rulers of disgusting, tormenting, or poisonous animals—flies, rats, mice, reptiles, &c. The Greeks worshipped several of their chief deities under the character of protectors against these animals; for instance, Apollo *Smintheus*, the destroyer of rats. Every one knows that Christ was charged by the Jews with driving out demons by the power of Beelzebub (Mat. xii. 24).

BEER (see ALE and BREWING). We have evidence of the use of this liquor for more than 2000 years. The Grecian poet and satirist Archilochus, who lived about 700 B.C., and the Greek tragedian Æschylus, who lived 500 B.C., call it *wine of barley*, and Herodotus also speaks of a 'wine' which the Egyptians made from barley. Diodorus of Sicily, who lived about the time of Julius Cæsar, about 50 B.C., mentions beer in his History (lib. i. cap. 20). Pliny also, about the middle of the first century after Christ, speaks of this beverage in several parts of his Natural History. He says that it is prepared in different ways, and that there is a species more intoxicating than wine. He says further, that in Spain it is called *celia* and *ceria;* but, in Gaul and in other provinces of the Roman empire, *cervisia;* that it was in general use among the ancient Germans, who also called it *cervisia*. The Egyptians, as the first promoters of agriculture, are said to have invented beer, and to have prepared a kind in later times at Pelusium, which was called by the name of that city, and was much celebrated. Beer was afterwards unknown in Egypt until the French army introduced it anew, since which it is said that beer is still brewed there. We are ignorant how far the beer of the ancients resembled the modern article. The Anglo-Saxon form of *beer* is *beor*, the German and Dutch *bier*.

BEET (*Beta*), a genus of plants belonging to the nat. order Chenopodiaceæ, distinguished by its fruit being inclosed in a tough woody or spongy five-lobed enlarged calyx. The seed-vessel is bony, depressed, and contains a single seed filled with a quantity of floury albumen, in which there lies an embryo rolled up in the form of a ring. Sometimes several calyxes grow firmly together, and thus produce the appearance of a compound fruit. The fruit is what is called seed in the seed-market. Two species only are known in general cultivation, namely, the sea beet (*B. maritima*) and the garden beet (*B. vulgaris*). The former is a tough-rooted perennial, very common on many parts of the sea-coast, where it forms a spreading, dark green bush, with narrow, oblong, shining, rather fleshy, wavy leaves, and a stem about 3 feet high, covered with distant green clustered flowers. Its leaves are an excellent substitute for spinach, on which account this plant is sometimes cultivated in gardens. The garden beet differs from the last in being of only biennial duration, and in forming a tender fleshy root. It grows wild in Sicily and on the coast of Barbary, and by some botanists is looked upon as a mere variety of the sea beet. Two principal forms of it are known to cultivators, the chard beet and the common beet. In the chard beet the roots are small, white, and rather tough, and the leaves are furnished with a broad, fleshy midrib, for the sake of which the variety is grown in gardens. The leaves vary in colour, some having white ribs, others being brilliantly yellow, red, orange, and crimson. The French, who call it *poirée*, or, if white, *poirée à cardes*, employ the ribs as a vegetable, dressing them like sea-kale; they have, however, an unpleasant earthy taste, and are not esteemed at English tables. Some writers regard this as a peculiar species, and call it *Beta cicla* or *hortensis*. The common beet includes all the fleshy-rooted varieties bearing the names of red beet, yellow beet, sugar beet, mangold-wurzel, &c. They differ in the size, form, colour, and proportional sweetness of the roots, but in other respects are the same, all requiring the same treatment under cultivation; for which see MANGOLD-WURZEL.

For garden purposes the best is the red beet of Castelnaudary, so called because it is raised chiefly in a place of that name in the S.W. of France (La Gironde); its roots are small, deep crimson, inversely conical, and almost wholly formed underground; its leaves, too, are deep purple. Other varieties of less moment are the yellow Castelnaudary, the white Silesian—very sweet, rather too large for gardens, but excellent for field culture, and much employed in the continental sugar-districts—the green-topped white, and two round-rooted sorts, called Bassano and the round yellow. The former is more highly esteemed than any other in Italy. All these should be sown in the month of May, in drills, where they may be set off with the hoe to 9 inches or a foot apart, according to their size. They require a deep, rich, light soil. Being a native of the Mediterranean, where our northern frosts are unknown, it will readily be understood that the garden beet is impatient of severe cold. For this reason it requires to be taken up in the beginning of winter, and packed in dry sand, or in pits like potatoes, the succulent leaves having been first removed.

Red beet is principally used at table, in salad, boiled, and cut into slices, as a pickle, and sometimes stewed with onions; but if eaten in great quantity it is said to be injurious to the stomach. The beet may be taken out of the ground for use about the end of August, but it does not attain its full size and perfection till the month of October. When good it is large and of a deep red colour, and when boiled is tender, sweet, and palatable. It has been ascertained that beet-roots may be substituted for malt, if

deprived of the greater part of their juice by pressure, then dried, and treated in the same manner as the grain intended for brewing. The beer made from the beet has been found perfectly wholesome and palatable, and little inferior to that prepared from malt. A spirit of good quality has also been made from it.

From the white beet the French, during the wars with Napoleon I., succeeded in preparing sugar, that article, as British colonial produce, having been prohibited in France. Since that time, in spite of many failures, the manufacture of sugar from beet-root has always advanced with the increase of chemical and technical knowledge, and it is now an important industry in many of the continental countries, and has even been introduced into England. In this country, however, it has not as yet attained to any importance, there being, perhaps, not more than one manufactory (at Lavenham in Suffolk) where it is carried on as a successful commercial speculation; but since experience has shown that sugar beet can be grown in England to as great perfection as in any part of the Continent, and that sugar can be profitably extracted from it, there is no reason why this industry should not speedily establish itself here. The eastern, south-eastern, and south-midland counties of England are considered to be the most suitable for the growth of the sugar beet; but it is thought likely that the south-eastern counties of Ireland may also be found suitable. The farmer runs very little risk by experimenting as a grower of sugar beet, seeing that one ton of it is equivalent in nutritive qualities as cattle-food to 1½ ton of common mangold. The refuse pulp also possesses valuable nutritive properties, 3 tons of it being equal to 1 ton of hay, and it is much relished by cattle. The countries in which the manufacture of beet-root sugar has made most progress are France, Germany, Austria, Russia, Belgium, and Holland. It is in those parts of these countries which most resemble our south-eastern counties in climate that it has succeeded best. The middle and south of France are too hot for it. In 1869 the total quantity of the sugar made in these countries (including also Poland, Sweden, and Italy) was ascertained to be 841,310 tons, of which France produced 285,146; the estimated production in 1870 was 925,000 tons, 300,000 being in France and 250,000 in Germany. About a twelfth of the total produce was imported into the United Kingdom, and beet-root sugar is now successfully competing with cane-sugar in the London and other English markets. The average quantity of sugar obtained from the best sorts of beet amounts to from 10 to 14 per cent. The leaves of the beet, when raised in a richly-manured soil, have been found to yield a considerable quantity of pure nitre, proceeding, in all probability, from the decomposition of the animal matter contained in the manure.

BEETHOVEN, Louis von, born at Bonn, 17th Dec. 1770, was the son of a man who had been a tenor singer in that place. His great talent for music was early cultivated. He astonished in his eighth year all who heard him, by his execution on the violin, on which he was in the habit of performing with great diligence in a little garret. In his eleventh year he played Bach's Wohltemperirtes Klavier, and in his thirteenth composed some sonatas. These promising appearances of great talent induced the then reigning Elector of Cologne to send him in 1792, in the character of his organist, and at his expense, to Vienna, that he might there acquire proficiency in composition under the instruction of Haydn. Under Haydn and Albrechtsberger he made rapid progress, and became likewise a great player on the pianoforte, astonishing every one by his extempore performances. In 1809 he was invited to the new court of the King of Westphalia, at which several men of distinction, and among them his pupil in music the Archduke Rodolph, subsequently Archbishop of Olmütz, persuaded him to remain by the promise of a yearly salary. He composed his principal works after 1801. A few years before his death a cold, which he had caught by composing in the open air, produced a deafness, which became by degrees very great. He lived afterwards very much retired in the village of Modlingen, near Vienna. Instrumental music has received from his compositions a new character. Beethoven united the humour of Haydn with the melancholy of Mozart, and the character of his music most resembles Cherubini's. His boldness is remarkable. Reichhardt, in a comparison of Beethoven with Haydn and Mozart, says, 'The quartett of Haydn was the offspring of his amiable and original character. In naïveté and good humour he is unrivalled. The more powerful nature and richer imagination of Mozart embraced a wider field, and many of his compositions express the whole height and depth of his character. He placed more value also on exquisite finish. Beethoven, early acquainted with Mozart's compositions, gave a still bolder cast to his ideas.' Besides his great symphonies and overtures, his quintetts, quartetts, and trios for stringed instruments, his numerous sonatas, variations, and other pieces for the pianoforte, in which he shows the great richness of his imagination, he also composed vocal music, but with less success. To this department belongs his opera Leonore (in its altered state called Fidelio), some masses, an oratorio (Christ on the Mount of Olives), and songs for the pianoforte, among which the composition of Matthison's Adelaide, called by the British Rosalie, and some songs of Goethe are celebrated. Beethoven died March 24th (some say 26th), 1827, near Vienna, after protracted sufferings.

BEETLE, a name applied sometimes in a wider, sometimes in a narrower, sense, to include a larger or smaller number of insects. It is often synonymous with the term Coleoptera (which see), while others apply it to the large tribe Scarabæidæ, which forms the greater part of that section of insects known as Lamellicornes. The latter is the sense in which it is here used. The beetle tribe comprises a large number of insects, among which some are very remarkable for projections or horns growing from the head and corselet. The species found in warm climates are generally of large size and formidable appearance, though by no means noxious. They all are winged, flying with much rapidity and force; when on the ground their movements are slow and heavy. The body of the perfect insect is oval, or nearly so, and the *antennæ* are composed of eight or ten pieces inserted into a cavity under the border of the head. From the arrangement of the *antennæ*, which is peculiar to this family, its essential or distinctive character is formed. The extremities of the *antennæ* are club-shaped, and composed of plates or joints, either disposed like the leaves of a book, or arranged perpendicularly to the axis, like the teeth of a comb. The two first legs of beetles, and even the others in some instances, are dentated externally, and suited for burrowing. The *tracheæ* are all vesicular.

The larvæ or young are soft, flexible, whitish, semi-cylindric worms, having the body divided into twelve rings, and having a scaly head armed with strong jaws. They have nine *stigmata* or breathing holes on each side; and the feet, which are six, are scaly. The body is thicker at the posterior than at the anterior extremity, rounded, and almost uniformly curved downwards, so that the larva moves with difficulty over an even surface, and frequently

tumbles down. The period during which the larvæ remain in the state of destructive worms varies in different species; those of some kinds becoming nymphs at the end of several months, and of others not sooner than in three or four years. During this period they live in the earth, where they feed upon the roots of vegetables, animal matter in a state of decomposition, &c. It is in this stage of their existence that various species prove exceedingly injurious to farmers from their great numbers and voracity. When about to undergo their change of form, they make an egg-shaped cover or cocoon, from fragments gnawed off wood, &c., which are stuck together by a peculiar glutinous fluid furnished by their bodies. The larvæ have a cylindric stomach, surrounded by three ranges of minute *cæca*, a very short, small intestine, an exceedingly large *colon*, and moderate-sized *rectum*. In the perfect insect none of these inequalities exist, as there is but one long intestine of equal size throughout. All of the beetle tribe are not destructive or injurious in their inceptive state, as many of them breed in the dung-heap, or feed upon the excrement of animals, which they serve to prepare more completely as manure. The dung-beetle, which is well known, forms a ball of dung, in the centre of which the egg is deposited, rolls it off to a distance, and buries it in the ground. Great numbers uniting in this work, speedily clear away excrementitious matter, that might otherwise soon prove offensive. Among the ancient Egyptians a species of dung-beetle was held in great veneration, and Eusebius informs us that it was regarded as the animated image of the sun. We find it generally embalmed with the Egyptian mummies, placed immediately upon the root of the nose. A number of models of these insects in clay and stone have been found in the places already explored in the ancient dominion of the Pharaohs. Linnæus bestowed the name of *Scarabæus sacer* on this species, which is found in Africa and Europe.

BEFANA (Ital.; from *Befania*, which signifies *Epiphany*) is a figure, generally representing an old woman, which is exhibited in Italy on the day of Epiphany by children, or in shops, &c., where things for children are sold. In Germany presents are given to children on Christmas-eve, and in France on New-year's evening, but in Italy on the day of Epiphany, and it is said that the befana brings them to good children. Generally a little bag is hung in the chimney, and next morning the children find the presents there.

BEG (*prince* or *lord*), the title of certain Turkish officers, several of whom are subject to a Beglerbeg. See BEY.

BEGA, CORNELIS, properly *Begyn*, a famous Dutch painter and engraver, born at Harlem in 1620, was a pupil of Adrian von Ostade, and, like him, excelled in the minute perfection with which he painted the scenes of ordinary life. Two of his best paintings, a Sailor's Meeting and a Peasant Family, are in the Berlin Museum, and another, a Mixed Assemblage of Peasants, is in the Pinakothek at Munich. His engravings consist of thirty-five plates, similar in character to his pictures. He led an unsettled and licentious life, and in 1664 died of the plague, which he caught from his mistress.

BEGGARY. See PAUPERISM.

BEGLERBEG (*prince of princes* or *lord of lords*) is the title of a high officer among the Turks, the governor of a province called a *beglerbeglic*, who has under him several sangiacs, begs, agas, &c. The governors of Rumili residing at Sophia, of Anatolia residing at Kutahia, and of Syria at Damascus, in particular, have this title.

BEGUARDS, or BEGHARDS. See BEGUINES.

BEGUINES (*beguttæ*), females who, without having taken the monastic vows, or bound themselves to obey the rules of an order, unite for the purpose of devotion and charity, and form societies, living together in houses called *beguinages* (which have been frequently enriched by donations), distinguishing themselves above others of the laity by their industry, their retired life, and their attention to the education of children. These societies originated, towards the end of the eleventh century, in Germany and the Netherlands, and were very flourishing in the twelfth and thirteenth centuries. They still exist in considerable numbers in the Netherlands. In imitation of them males formed similar societies, under the name of *beghards*. These societies, whose names signify *suppliants* or *beggars*, underwent many persecutions from the jealousy of the clerical orders, and were sometimes confounded with the Lollards. (See FRATERNITIES.) There are in some places of Germany beguinages, which are, however, only eleemosynary institutions, where unmarried females of the lower class of people have a lodging free of expense, and enjoy some other advantages. There are also several beguinages in Belgium.

BEHAIM, MARTIN, born at Nuremberg about 1430, is distinguished as one of the most learned mathematicians and astronomers of his age. He was engaged in commerce, and travelled for the purpose of carrying on his business, from 1455 to 1479; but he also devoted himself to the study of the mathematical and nautical sciences, in which Regiomontanus is said to have been his master. He went from Antwerp to Lisbon in 1480, where he was received with marks of distinction. He sailed in the fleet of Diego Cam on a voyage of discovery (1484–86), and explored the islands on the coast of Africa as far as the river Zaire. He is also said to have discovered, or at least to have colonized, the island of Fayal, where he remained for several years, and assisted in the discovery of the other Azores. He was afterwards knighted, and returned to his native country, where he constructed a terrestrial globe in 1492, which bears the marks of the imperfect acquaintance of that age with the true dimensions of the earth. Behaim died, after many voyages, in Lisbon, 1506. Some ancient Spanish historians assert that he made many discoveries, and that he gave to his friend Columbus the idea of another hemisphere. Robertson (in his History of America) and others contradict this statement. It is also rejected by Irving.

BEHAM.—1. HANS SEBALD, a celebrated painter and engraver, born at Nürnberg in 1500, studied under Albert Dürer, and was one of his ablest scholars, but rendered his talents worse than useless, both to himself and society, by employing his pencil for the most profligate purposes. The disgust produced by his licentiousness drove him from his native town to Frankfort-on-the-Maine, where dissipation made his downward progress very rapid, and after contracting additional infamy by keeping a tavern of the worst description he died, or as some say, was put to death, about 1550.——2. BARTHEL, cousin of the former, and also pupil of Albert Dürer, after having given proof of excellence as a painter, was sent by Duke William of Bavaria to complete his studies at Rome, and died there in 1540. A picture by him in the Pinakothek at Munich ranks among the master-pieces of the old German school.

BEHEADING, a capital punishment, wherein the head is severed from the body by the stroke of an axe, sword, or other cutting instrument. *Decollatio*, or beheading, was a military punishment among the Romans. In early times it was performed with an axe, and afterwards with a sword. It is worth re-

marking, that in all countries where beheading and hanging are used as capital punishments, the former is always considered less ignominious. Thus, in this country, beheading is generally the capital punishment of nobles, while that of commoners is hanging. The crime of high-treason is always punished with beheading. Commoners, however, are hanged before the head is cut off, and nobles also, unless the king remits that part of the punishment. In Prussia, formerly, a nobleman could not be hanged, and if his crime was such that the law required this punishment, he was degraded before the execution. At present hanging is not used in that country, and since so many instances have occurred of extreme suffering on the part of the criminal, caused by the unskilfulness of the executioner in beheading with the sword, this mode of execution has been abolished. Beheading in Prussia is now always performed with a heavy axe, the sufferer being previously tied to a block. In Scotland beheading was anciently performed by an edged instrument called the *maiden*, introduced into this country by the Regent Morton, who was the first that suffered by it. This instrument, somewhat similar in its construction to the guillotine, has been preserved, and may still be seen in the apartments of the Society of Scottish Antiquaries. In France, during the revolutionary government, beheading by means of a machine, the guillotine (which see), came into use, and still prevails there, to the exclusion of all other modes of capital punishment. A person who has murdered his father or mother, however, has his right arm cut off the moment before he is guillotined. In the middle ages it was, in some states, the duty of the youngest magistrate to perform the executions with the sword. In China it is well known that beheading is practised, sometimes accompanied with the most studied torments. In the United States of America beheading is unknown, the halter being the only instrument of capital punishment. Respecting the bad or good consequences of public beheading the same remarks may be made which are applicable to public executions in general. In many European countries beheading with the sword still prevails.

BEHEMOTH, the name of an animal most poetically and graphically described in Job xl. 15, to the end. It is evidently an herbivorous animal; but commentators and naturalists are not agreed as to the particular species. Bochart, Gesenius, and others think the description most applicable to the hippopotamus; others think it was the elephant. The application of the description to the elephant receives some confirmation from the fact that the modern Arabs are in the habit of adding the epithet *mehemoth* to their name for this quadruped when he is very large, which appears to be the same as the Siberian word *mammoth*. Nor would it militate much against this interpretation that the elephant is not a native of the country in which the scene of the poem is laid. The author of the book of Job, whether Moses or not, may have been familiar with life in Egypt and Arabia, and if so, would naturally introduce scenery and adjuncts Egyptian or Arabian, or both combined; and that the elephant was well known in Egypt is proved not only by the use of ivory in the arts, specimens of which are preserved in abundance, but also by the representation of the animal itself on early Egyptian monuments.

BEHISTUN, or Bisutun, a mountain near a village of the same name, not far from Kermanshah, in Persian Kurdistan, celebrated for the sculptures and cuneiform inscriptions cut upon one of its sides —a rock rising almost perpendicularly to the height of 1700 feet. These works stand at the height of about 300 feet from the ground, and were executed by the orders of Darius I., king of Persia. The inscriptions set forth his genealogy, enumerate his nineteen victories obtained against the rebels in different provinces of his empire, and proclaim the final pacification of the latter, and his gratitude to God. The sculptures consist of a large tablet, on which are represented a king with his foot upon a prostrate man, two long-speared warriors behind him, nine captives chained together by the neck before him, and above the whole a mythological figure. The inscriptions are executed with great neatness, and the whole monument is very well preserved, the rock, which had been carefully polished, having been coated with a hard silicious varnish. The mountain has been well known from ancient times, having been mentioned by Diodorus under the name of Bagistanon (in old Persian 'dwelling of the gods'). The same writer mentions also that an inscription and figures were engraved upon the rock by the orders of Semiramis, but these, if they ever existed, have now disappeared. Rawlinson was the first to copy and decipher the Behistun inscriptions.

BEHN, Aphra, a lady of some celebrity as a writer of plays and novels, was descended from a good family in Canterbury, of the name of Johnson, and was born in the reign of Charles I. Her father, through the interest of his relation Lord Willoughby, being appointed Lieutenant-general of Surinam, embarked with his family for the West Indies, taking with him Aphra, who was then very young. The father died at sea; but his family arrived safely at Surinam, and remained there some years, during which time Aphra became acquainted with the American Prince Oroonoko, whom she made the subject of a novel, subsequently dramatized by Southern. On her return to England she married Mr. Behn, a merchant of London of Dutch extraction; but was probably a widow when selected by Charles II. as a proper person to acquire intelligence on the Continent during the Dutch war. She accordingly took up her residence at Antwerp, where she engaged in gallantries to obtain intelligence; and it is said that, by means of one of her admirers, she obtained advice of the intention of the Dutch to sail up the Thames, which she transmitted to England. This intelligence, although true, being discredited, she gave up politics, returned to England, and devoted herself to intrigue and writing for support; and as she had a good person and much conversational talent, she became fashionable among the men of wit and pleasure of the time. She published three volumes of poems, by Rochester, Etherege, Crisp, and others, with some poetry of her own; and wrote seventeen plays, the heartless licentiousness of which was disgraceful both to her sex and to the age which tolerated the performance of them. She was also the author of a couple of volumes of novels, and of the celebrated love-letters between a nobleman and his sister-in-law (Lord Gray and Lady Henrietta Berkeley). Pope, in his Character of Women, alludes to Mrs. Behn, under her poetical name of *Astrea:*

> 'The stage how loosely does Astrea tread,
> Who fairly puts her characters to bed.'

She died in 1689, between forty and fifty years of age, and was buried in the cloisters of Westminster Abbey. An edition of her works was published in 1872.

BEHRING, Vitus, captain in the Russian navy, was born at Horsens, in Jutland. Being a skilful seaman, he was employed by Peter the Great in the navy established at Cronstadt. His talents and the undaunted courage displayed by him in the naval wars against the Swedes, procured him the honour

of being chosen to command a voyage of discovery in the Sea of Kamtschatka. He set out from St. Petersburg, Feb. 5, 1725, for Siberia. In the year 1728 he examined the northern coasts of Kamtschatka as far as lat. 67° 18′ N., and proved that Asia is not united to America. It remained, however, to be determined whether the land opposite to Kamtschatka was in reality the coast of the American continent, or merely islands lying between Asia and America. June 4, 1741, he sailed, with two ships, from Ochotsk, and touched the N.W. coast of America, between lat. 35° and 69° N. Tempests and sickness prevented him from pursuing his discoveries: he was cast on a desolate island, covered with snow and ice, where he grew dangerously sick, and died, Dec. 8, 1741.

BEHRING'S STRAIT, SEA, and ISLAND.—The STRAIT is the channel that separates the continents of Asia and America, and which connects the North Pacific with the Arctic Ocean. Its breadth at the narrowest part, which is between Cape Prince of Wales on the American coast, and East Cape in Asia, is about 36 miles, but it widens rapidly both to the N. and S. of these points. Its depth in the middle varies from 29 to 30 fathoms. On both sides of the strait are several commodious bays; but the country has a repulsive aspect, being barren and rocky, with but a scanty display of vegetation. The sea here is frozen over every winter, and foggy, hazy weather is almost perpetual; the sun seldom shining, even in the summer, for more than a few hours, and being often invisible for days together. Whales frequent the strait, and the walrus occurs in vast numbers. The inhabitants on either shore support themselves chiefly by hunting and fishing; but those on the Asiatic side are greatly superior, both physically and intellectually, to those on the American. The strait is called after Vitus Behring (see preceding article), by whom it was first discovered. It was, however, more fully explored by Captain Cook in 1778, who surveyed the whole length of both coasts.——BEHRING'S SEA, sometimes called the Sea of Kamtschatka, is that portion of the North Pacific Ocean lying between the Aleutian Islands and Behring's Strait, or between lat. 50° and 63° N.; having Alaska Territory on the E. and the peninsula of Kamtschatka and the country of the Tchuktchi on the W.——BEHRING'S ISLAND is in the S.W. part of the above sea, off the E. coast of Kamtschatka, the most westerly of the Aleutian chain. It is uninhabited, and is without wood. It has, however, several springs of excellent water, and fine cataracts; and is frequented by various marine animals. Here the celebrated navigator Behring died under the most unhappy circumstances, having been wrecked on this barren island on November 3, 1741, where neither food nor shelter of any kind were to be obtained.

BEIRA, a province of Portugal, bounded chiefly by the river Douro on the N., by Spain on the E., by the Tagus and Portuguese Estremadura on the S., and by the Atlantic on the W. Its extent is computed at 9244 square miles, and the pop. in 1868 was 1,288,994. Beira contains seven episcopal cities, and about 230 other towns: the chief one is Coimbra (which see). It is mountainous, being traversed by the Serra d'Estrella, and well watered by the Douro, Tagus, Aguada, and Mondego. Though not fertile in grain, the produce of wine and olives is considerable. The heir-apparent of the crown is styled Prince of Beira.

BEIRAM. See BAIRAM.

BEIT-EL-FAKIH, a town, Arabia, Yemen, 32 miles S.S.E. of Hodeidah, and 77 N.E. of Mocha. It is without walls, but has a strong castle. It is celebrated for its trade in Mocha coffee, which is chiefly grown in the neighbourhood. Merchants from Persia, Russia, and Turkey visit the town for the purpose of purchasing the coffee. Pop. 8000. The word *Beit*, signifying a house or hut, is prefixed to the name of various other small towns and villages in Arabia.

BEITH, a town and parish in the district of Cunningham, Ayrshire. The town is situated 11 miles W. from Paisley, on a small eminence, and is tolerably well-built; its new church, on the south of the town, forming a picturesque object for many miles round. Tanning, spinning, and weaving are the chief employments, and an active trade is carried on in seed and grain. The remains of a stately castle, the residence of the Montgomeries of Giffin, is in this parish. Pop. of town in 1871, 3707.

BEJA (anciently *Pax Julia*), a town, Portugal, province of Algarve, 85 miles S.E. of Lisbon, with 5284 inhabitants. It stands on a height, surrounded by walls flanked with forty towers, and defended by an old fort. It was founded by the Romans, and some Roman remains are still visible. Beja is also the name of the district in which the town lies.

BEJAPOOR (anciently *Vijayapura*, the impregnable city), a ruined city of Hindoostan in the Bombay presidency, near the borders of the Nizam's Dominions, about 245 miles S.E. of Bombay, and near the right bank of an affluent of the Krishna. From the great extent of its ruins it would seem to have been one of the largest cities of India, while the splendour of these remains have procured for it the title of the Palmyra of the Deccan. In its present state it may be described as two cities adjoining each other—the fort on the E., and the old city on the W. The former, though much less than the latter, has one entire and regular street 50 feet wide and nearly 3 miles long. Groups of houses stand scattered over its extensive area, and numerous mud hovels are seen stuck up among its massy ruins. Some of the mosques and mausoleums of Bejapoor exhibit specimens of elaborate architectural elegance, but the prevailing character is solid and massive. The great dome of Mahomet Shah's tomb is visible at the distance of 14 miles; and numerous spires, cupolas, and minarets are still standing. The fretwork on the ceilings and verandahs, the panels covered with passages of the Koran in bass-relief, and stone trellises pierced with a mesh-work of Arabic characters, are all in the richest style of oriental sculpture. Among the religious structures is a low Hindoo temple, built in the earliest and rudest style of Brahmanical architecture, and popularly supposed to have been raised by the Pandus, a mythical race. There are here some guns of enormous size; one of brass, cast in 1549, capable, it is said, of carrying an iron ball of 2646 lbs. weight! It was intended to send this gun to England, but the state of the roads rendered its removal to the coast impracticable.

BEKES, BEKESVAR, or BEKESCH, a market town, Hungary, capital of the county of same name, at the junction of the Black and White Körös, 41 miles S.W. of Grosswardein; formerly strongly fortified, and having three churches. Chief productions—flax, cattle, corn (particularly wheat), wine, and honey, in all of which the trade is considerable. Pop. at the end of 1869, 22,547.

BEKKER, ELIZABETH, an ornament of Dutch literature in the department of the belles-lettres. Few female authors have united with so great talents so much dignity and purity of morals. The influence of her numerous works was much increased by her character, and several of them are considered classics in Dutch literature, particularly her romances Willem Leevend, in eight vols.; Letters of A. Blankart to C. Wildschut; and the History of Sara Burgerhart.

She wrote her most important works in conjunction with her friend Agatha Deken, and the share of each in the composition of them is unknown. Elizabeth was born at Flushing in 1738, and died at the Hague in 1804. Her friend followed her nine days later.

BELA, the name of four kings of Hungary belonging to the Arpad dynasty.—Bela I., son of Ladislaf, competed for the crown with his brother Andrew, and at first so unsuccessfully that he was obliged to take refuge in Poland. Having there obtained assistance, he returned at the head of a powerful force, defeated his brother, who perished in the action, and mounted the throne in 1061. He immediately began a series of important reforms, and was contemplating others when he was suddenly cut off in 1063.——Bela II., surnamed the Blind, because his eyes had been put out in early life by his uncle, succeeded to the throne in 1131, and at first seemed inclined to act with moderation and justice, but the vindictive spirit of his queen involved him in quarrels with his nobles, and his own intemperate habits brought on a disease which terminated his life in 1141.——Bela III. succeeded his brother Stephen III. in 1173, and held the reins of government with a strong hand, vigorously correcting the abuses and putting down the turbulent spirit which the troubles of previous reigns had engendered. He also repelled the incursions of the Bohemians, Poles, and Austrians, and retaking the towns of which the Venetians had possessed themselves, compelled them to accept of peace in 1189. He died in 1196, and was succeeded by Emeric, one of two sons by his queen, a sister of Philip Augustus, king of France.——Bela IV. succeeded his father Andrew II. in 1235, and was shortly after obliged to collect an army to oppose the Tartars, who had invaded the country and were committing fearful ravages. In the battle which ensued he was signally defeated, and obliged to take refuge in Austria, where he was detained prisoner, and only recovered his liberty by the payment of a heavy ransom. To escape the Tartars, who still continued their ravages, he retired to Dalmatia, but ultimately regained his throne in 1244 by the aid of the knights of Rhodes. In a war with Austria he defeated and slew Duke Frederick, but in that with the Bohemians, headed by King Ottokar, fortune turned against him and he was obliged to submit to a disadvantageous peace. He died in 1270.

BELBEIS, or Belbeys, a town, Lower Egypt, 28 miles N.N.E. of Cairo, on the road from that city to Syria—a circumstance which gives it considerable importance, in despite of its want of attractions in other respects, being ill built and dirty. It was occupied in 1798 by the French army, when its fortifications were repaired. They are now falling into decay, the walls being composed chiefly of mud. Belbeis is successor to the ancient *Bubastis*, from the site of which it is 14 miles distant. In the neighbourhood are traces of the ancient canal that joined the Nile to the Red Sea. Pop. 5000.

BELEM, a town of Portugal, on the right bank of the Tagus, 2 miles W.S.W. of Lisbon, of which it may almost be considered a suburb. It contains a fine church, a monastery, an hospital, and a high-school. The Torre de Belem, a remarkable square tower rising out of the Tagus, commands the entrance to Lisbon. Many of the nobility and rich citizens of Lisbon stay here.

BELFAST, a seaport, municipal and parliamentary borough of Ireland, principal town in the province of Ulster, and county town of Antrim, at the termination of the river Lagan in the head of Belfast Lough, 101 miles N.N.E. of Dublin; lat. 54° 36′ 24″ N.; lon. 5° 55′ 12″ W. It is built on low alluvial land on the left bank of the Lagan, the greater part of it not more than 6 feet above high-water mark. The sewerage is defective and the water supply too small, yet the town is pretty healthy. Measures have been taken in hand for the improvement of the sewerage and other sanitary defects, and also for increasing the water supply. The streets are spacious, regular, and well lighted and macadamized; the houses, mostly of brick, are well built—some of them very handsome. Ballymacarret, in county Down, on the right bank of the Lagan, may be considered a part of the town. Four bridges cross the river, one of them an elegant structure of five arches, each 50 feet span.

Belfast possesses a Roman Catholic cathedral, with several other churches and schools belonging to the same body; and it has also a number of Presbyterian, Episcopalian, and Methodist churches, besides some belonging to other bodies. Many of these are handsome buildings: of the Episcopal churches, St. Anne's, the oldest, with a graceful cupola; Trinity, a fine specimen of pointed Gothic; and St. George's, adorned with a beautiful portico, are most deserving of notice: the more modern of the Presbyterian churches display increasing taste, and St. Peter's Church (Roman Catholic) is the most magnificent in Belfast. Of the educational institutions the most prominent is Queen's College, first opened to students in 1849, with a president, vice-president, and twenty professors. Of the others we may mention the theological colleges of the Presbyterians and the Methodists, the latter erected by voluntary contributions in 1868 at a cost of £24,000; the Royal Academical Institution, the model National, the Lancasterian, and the ragged schools. The charitable institutions comprise the district lunatic asylum, the deaf and dumb and blind asylum, the Ulster female penitentiary, union workhouse, &c. The other public buildings of note are the town-hall; the county court-house; the Commercial Buildings and exchange; the Linen Hall; the range of buildings for the customs, inland revenue, and post-office; the offices of the Ulster Bank, the Scottish Amicable and the North British and Mercantile Assurance Companies; the county jail; the Ulster Hall; the Albert memorial clock-tower, 143 feet high; the theatre, &c. In the suburbs there is an extensive public park, a botanic garden of 17 acres, and the borough cemetery.

Belfast Lough is a spacious estuary, affording safe anchorage, about 12 miles long, and 6 miles broad at the entrance, gradually narrowing as it approaches the town. Large vessels had formerly to lie in the pool or basin of Garmoyle, 4 miles from Belfast; but in 1840 a new channel was opened for the Lagan, and large vessels can now enter the harbour. The accommodation for shipping is extensive, and has been vastly increased of late years, new docks having been constructed which afford an additional water area of 25 acres. There is a graving-dock 450 feet long, and capable of admitting the largest vessels. The country round Belfast is extremely beautiful; the position of the town renders its appearance from a distance by no means imposing, but the lough itself is a fine object; and the slopes of the hills that bound it and partly encircle the town are thickly studded with the villas and country houses of the merchants.

Belfast is the centre of the Irish linen trade, as well as the chief seat of the manufacture of both linen and cotton in Ireland. In 1870 there were in the counties of Antrim and Down eighty-five factories with 744,918 spindles and 10,273 power-looms employed in spinning and weaving flax, most of them in Belfast or its immediate vicinity. Previous to about 1830 the cotton manufacture was the leading industry of Belfast, but it has rather receded than advanced, and is now comparatively unimportant.

There are two large shipyards, with two patent slips; and on Queen's Island, formed when the new channel was made, the building of iron ships is extensively carried on. There are several breweries, flour and corn mills, foundries, printworks, chemical works, ropeworks, and felt manufactories in the town.

The commerce of Belfast is very considerable, and is rapidly increasing. The most important branch is across the Channel; a large fleet of steamers ply regularly between Belfast and London, Plymouth, Liverpool, Fleetwood, Morecambe, Barrow, Whitehaven, Ardrossan, Glasgow, Dublin, Waterford, &c. There is also an extensive direct trade with British North America, the Mediterranean, France, Belgium, Holland, and the Baltic. In 1786 only 772 vessels (34,287 tons) entered the port; whereas in 1871, 8213 vessels, with an aggregate burden of 1,223,821 tons, entered in the foreign, colonial, and coasting trades, and 3542 vessels of 760,529 tons cleared. Over 1,000,000 tons entered in the trade with Great Britain. The inland trade is carried on by the Lagan Navigation, which connects the town with Lough Neagh; the Ulster Canal, connecting Lough Neagh with Enniskillen; and by three systems of railway, namely, the Ulster, the Northern Counties, and the County Down.

Belfast is comparatively a modern town. Up to the beginning of the seventeenth century we hear only of a castle, which seems to have passed through several hands during the reigns of the later Tudors. In 1613 Belfast was constituted a municipal and parl. bor., with two representatives in the Irish Parliament; but its prosperity subsequently was much impeded by the civil war, during which it was successively occupied by both parties. The cotton trade was introduced in 1777, and from this chiefly its prosperity is considered to have arisen. The municipal government consists of ten aldermen and thirty councillors, one of whom is mayor. The harbour is under the management of an independent board. It returns two members to the Imperial Parliament. Pop. in 1851, 100,067; in 1861, 121,602; according to the census of 1871 the pop. was 174,394, showing the enormous increase of 52,792 within the ten years.

BELFAST, a seaport, and capital of Waldo county, Maine, United States, 224 miles N.E. Boston. Pop. in 1870, 5278. It is delightfully situated on Belfast Bay, at the mouth of a small river of the same name, and at the N.W. part of Penobscot Bay. It has a good harbour and great maritime advantages, and is a flourishing town.

BELFORT, or BEFORT, a fortified town of the first class, France, in the former department of Haut Rhin, on the Savoureuse, 40 miles S.S.W. of Colmar. It is well built, and has an ancient castle situated on a lofty rock, a fine parish church, barracks, townhouse, court of primary resort, public library containing 20,000 volumes, and a communal college. Manufactures—hats, clocks, wax tapers, iron-wire, sheet-iron, &c. There are also breweries, tanneries, and iron furnaces. The principal trade is in grain, wine, brandy, and liqueurs. Iron is extensively worked in the neighbourhood. In 1814 Belfort was besieged by the allies without success. In the Franco-German war it was invested by the Germans, Nov. 3, 1870, and after holding out with great bravery for more than three months, capitulated Feb. 16, 1871. In recognition of the bravery which the garrison had shown in its defence, it was allowed to march out with full military honours. Belfort, with the district immediately surrounding it, is the only part of the department of Haut Rhin which remained to France on the cession of Alsace to Germany, Feb. 26, 1871. Pop. 8400.

BELGÆ, a collection of German and Celtic tribes who inhabited the country extending from the Atlantic Ocean to the Rhine, and from the Marne and Seine to the southern mouth of the Rhine, which is united with the Meuse. From time to time, until the period of Cæsar, German nations pushed forward beyond the Rhine, partly expelling the Celts from their seats, partly uniting with them; and from this union sprang a mixed nation, which, in its language as well as in its manners, resembled the Germans more than the Celts. According to the testimony of Cæsar, they were the most valiant of the Gauls, particularly that portion which resided on the northern frontiers of Germany.

BELGAUM, a town and fortress, Hindoostan, province of Bejapoor, presidency of Bombay, district and 55 miles N.W. of Darwar, on a plain 2500 feet above the sea-level. In 1818 the fort and town were taken by the British, after a gallant resistance by the peishwa's forces. From the salubrity of the climate and the purity of the water, Belgaum has been selected as a permanent military station. Pop. of town, 7652.

BELGICA, a part of ancient Gaul, was originally the land of the Bellovaci and Atrebates, who lived in the neighbourhood of the city of Amiens, and perhaps of Senlis.

BELGIOJOSO, a town, kingdom of Italy, in the territorial compartment of Milan, province and 8 miles S.E. of Pavia. It is situated in a beautiful and remarkably fertile plain between the Po and the Olona, from each of which it is about 1½ mile distant. It is well built, and contains a parish and an auxiliary church. The old castle, in which Francis I. was temporarily lodged after being taken prisoner at the battle of Pavia, in 1525, has been converted into a magnificent château, surrounded by fine gardens. Belgiojoso has an important annual fair, which lasts three days. Pop. 2740.

BELGIUM (French, *Belgique;* German, *Belgien*), a kingdom in the west of Central Europe, between lat. 49° 30′ and 51° 30′ N., and lon. 2° 35′ and 6° 7′ E.; bounded N. by Holland, N.W. by the North Sea or German Ocean, W. and S. by France, and E. by the duchy of Luxemburg, Rhenish Prussia, and Dutch Limburg; greatest length, N.W. to S.E., 165 miles; greatest breadth, N. to S., 120 miles; area, about 11,400 square miles. Belgium, in shape, resembles a triangle, which has its vertex in the west; the base resting on Germany on the east, the shorter side facing Holland and the sea, and the larger forming the frontier of France. For administrative purposes it is divided into nine provinces—Antwerp, South Brabant, East Flanders, West Flanders, Hainaut, Liége, Limburg, Luxemburg, and Namur. These provinces do not differ much in area, and are so arranged as to form a compact and commodious division of the kingdom. South Brabant, which, from containing Brussels, the capital, may be considered the metropolitan province, occupies the centre, while the others cluster round, and, with exception of the extreme provinces of Luxemburg and West Flanders, actually touch it.

The following table shows the areas of the different provinces, with their pop. on 31st Dec. 1870:—

	Area in sq. m.	Population.
Antwerp,	1093	492,482
Brabant,	1267	879,814
Flanders, East,	1157	668,976
Flanders, West,	1248	837,726
Hainaut,	1436	896,285
Liége,	1116	592,177
Limburg,	931	200,336
Luxemburg,	1705	205 784
Namur,	1413	313,525
	11,366	5,087,105

Physical Features.—A general idea of the surface of the country may be obtained by regarding it as an inclined plane, somewhat rugged, and considerably elevated in the S.E., from which it slopes, more or less gradually, N. and W., till it sinks into low plains, only a few feet above the level of the sea. The elevated districts are formed by ramifications of the Ardennes, which, entering Belgium from France, stretch along the S. of Namur, occupy the greater part of Luxemburg, and attain their culminating point in the S.E. of Liége at Stavelot, in the neighbourhood of Spa, where the height exceeds 2000 feet. The rocks appear to rest on primary formations; but those which reach the surface generally consist of slate, old red sandstone, and mountain limestone. Proceeding N.W., in the direction of the dip, these rocks take a cover, and the coal formation becomes fully developed. This coal-field is a continuation of that of the N. of France, and stretches through Belgium in a N.E. direction, occupying the greater part of the province of Hainaut, and a considerable part of that of Liége, and skirting the provinces of Namur and Luxemburg. It contains numerous workable seams, both of coal and iron. North and west, beyond the limits of this coal-field, a more recent formation is found, covered by deep beds of clay and sand, the former prevailing more in the interior, and the latter near the coast, where it has been drifted into hillocks or downs, and forms the only barrier against the encroachments of the sea. Some of the clay in this district is fit for the manufacture of fine pottery; but the greater part of it is fit only for coarse ware, or for bricks. In accordance with the general slope of the surface already mentioned, the main streams of Belgium have a N. direction; and the whole country lies within the basin of the German Ocean. In the S.E., where the surface is elevated and broken, numerous torrents descend with rapidity; and becoming confined within rocky, precipitous, and richly woody banks, often furnish, if not the grandest, the most picturesque and enchanting of landscapes. On reaching the lower country their speed is slackened, and their augmented volume moves along in a slow winding course. Only two of them—the Meuse and the Scheldt—have a magnitude which entitles them to the name of rivers; but so important are these two in themselves, and so numerous their affluents, that no country in Europe is better supplied with water communication. Besides the Scheldt or Schelde, and Meuse or Maas, the navigable streams are the Ambleve, Demer, Dender, Darme, Dyle, Lys, Great Nethe, Little Nethe, Ourthe, Rupel, Sambre, Yperlee, and Yser. The climate of Belgium bears a considerable resemblance to that of the same latitudes in England. Though subject to sudden change, it is on the whole temperate and agreeable. Luxemburg and Namur, where the surface is high, and the numerous hills and dales which diversify it both cheer the animal spirits and freely circulate an air at once keen and pure, are most favourable to health and longevity. The only parts of the country which can be considered unhealthy are the low flats which prevail in Flanders, and the polders or rich alluvial tracts which have been gained from the rivers by embankment, chiefly in Antwerp. There agues and other diseases engendered by a humid and sluggish atmosphere are prevalent.

Woods and Forests.—Nearly one-fifth of the whole surface of the kingdom is occupied by wood. The distribution of it, however, is by no means equal; and hence, while the two Flanders and Antwerp fall far below the average amount, Luxemburg and Namur rise far above it, and are very densely wooded. In these provinces extensive tracts are covered with natural woods, in which the wolf and wild boar still have their haunts. These woods are the remains of the ancient forest of Ardennes, which Cæsar describes as stretching far out into France from the banks of the Rhine. They consist of hard wood, principally oak, which is often of great size, and furnishes large quantities of the most valuable timber. By carefully dressing the stools after it is cut, a fine oak copse is raised, the cuttings of which annually produce many tons of bark, which not only supplies the tanneries of the country, but leaves a considerable surplus for exportation, chiefly to England, while the wood unfit for the carpenter is partly employed as fuel and partly converted into charcoal for the use of the iron-works, where the superiority of the iron smelted and wrought by it is well known. South Brabant also possesses several fine forests, among others that of Soignies, with which the field of Waterloo has made us familiar. In the other provinces scarcely anything deserving the name of forest is seen. Wood is distributed over them in occasional patches, and more frequently in the form of hedgerow. The timber thus grown is by no means small in aggregate amount, and forms a well-known feature in the rich rural landscapes which the old Flemish masters loved to paint; but taking into account the injury which the cultivated crops sustain from it, it is very questionable whether it ought to be regarded as a source of profit either to individual proprietors or to the country at large. The timber itself, consisting principally of various kinds of poplar, is soft and of an inferior description.

Agriculture.—The greater part of the country is well adapted for agricultural operations, and the inhabitants have so happily availed themselves of their natural advantages that they early began, and in some respects still deserve, to be regarded as the model farmers of Europe. In the high lands traversed by the Ardennes the climate is ungenial, and the soil so shallow and stony as almost to forbid the labour of the plough. Here the occupants display their skill, not so much by what they do, as by what they refrain from attempting. Instead of vain endeavours to force the growth of corn where it could never yield an adequate return, they have been contented to turn the natural pastures of the district to the best account by employing themselves chiefly in the rearing of stock. In particular they produce a hardy breed of horses, which, being admirably adapted for light cavalry, are largely exported to France for that purpose, while vast herds of swine are fed almost at no expense on the mast of the forests. At the same time no part of the surface is allowed to lie waste. Where arable land occurs it is carefully applied to its proper use. Even the vine has not been forgotten, and sunny slopes on which little else could have been grown have been made to yield a tolerable wine. In the opposite extremity of Belgium, chiefly in the province of Antwerp, and partly in that of Limburg, an extensive tract occurs which strikingly contrasts in appearance with the hilly districts of the S.E., but is perhaps still less adapted for the ordinary operations of agriculture. This tract, known by the name of Campine, is a vast expanse of moorland waste of the most dreary appearance, a dead monotonous flat composed for the most part of barren sand, in which the ordinary heaths and lichens will scarcely grow. The greater part of this tract seems destined to remain for ever in its natural state, but whenever a patch of more promising appearance occurs the hand of industry has been at work, and corn-fields and green pastures have become not unfrequent even in the Campine. Agricultural colonies, partly free and partly compulsory, have been planted in different parts of the district. The former consist of persons generally in poor circumstances who have voluntarily

engaged in reclaiming barren tracts as the means of procuring a maintenance and saving them from the degradation of pauperism. The latter consist of convicts, who, having forfeited their liberty, give compulsory labour as the penalty of their offences. By the united exertions of both a wondrous improvement has been made, and on parts of this waste some of the finest cattle of the country are reared, and much dairy produce of excellent quality is obtained. Still, however, about 300,000 acres remain untouched. With exception of the two districts now described, there is no part of Belgium in which agriculture does not flourish; but the husbandry which has been so much lauded is seen in its greatest perfection in the two Flanders. Its excellence is owing not to any superior knowledge of what may be called the theory of agriculture, nor to any remarkable ingenuity in the invention of implements by which its operations are more efficiently or more cheaply performed, but chiefly to an innate spirit of economy and industry—an economy which carefully appropriates every gain, however small, and an industry which grudges no labour, however great, provided it is possible, by the application of it, to obtain an additional amount of valuable produce. In fact, the Flemish husbandry partakes more of the nature of garden than of field culture. In many of its operations, no doubt, horse labour is employed. The plough and the harrow are in frequent requisition, but the implement on which the greatest dependence is placed is the earliest and simplest of all—the spade. To give full scope for the use of it, the ground is parcelled out into small fields of a square form, which have their highest point in the centre, and slope gently from it in all directions towards the sides, where ditches of sufficient size carry off the superfluous water as it filters into them. To promote this filtration the ground is trenched to a uniform depth, so that the slope of the subsoil corresponds as nearly as possible to that of the surface. In performing this trenching a considerable degree of skill and ingenuity is displayed. The performance of the whole at once would be a formidable and not a very efficient process. In a few years a new subsoil would be formed, and the trenching would require to be renewed. This is rendered unnecessary in the following manner. The land is laid out in ridges about five feet wide, and when the seed is sown it is not covered as usual by the harrow, but by earth dug from the furrows to the depth of two spits, and spread evenly over the surface. By changing the ridges and throwing the furrow of the previous year into the ridge of the next, the whole ground becomes furrow in the course of five successive crops, and is consequently trenched to the depth of about 18 inches. This process of trenching never ceases, and is unquestionably one of the most important characteristics of the Flemish husbandry. The only other process particularly deserving of notice is the care and skill manifested in securing an adequate supply of manure. Every farm is fully stocked, and the cattle, instead of being grazed in the fields, are fed at home, in winter on turnips and other roots, and in summer on green crops carefully arranged, so as to come forward in regular succession, and yield a full supply of rich succulent food. In addition to this, every homestead has a tank, built and generally arched with brick, into which all the liquids of the cattle-sheds are conveyed, and have their fertilizing properties increased by the dissolution of large quantities of rape-cake. This liquid manure is of singular efficacy in promoting the growth of flax, which enters regularly into the Flemish rotation, and is perhaps the most valuable crop of all, the produce of an acre being not unfrequently sold for £50. As this crop is one of the most exhausting which can be grown, and requires the richest manure, while it yields none, the growth of it to any great extent must, without the aid of the tank, have been impossible. At present, in Flanders alone, the value of flax annually raised has been estimated to amount to £1,500,000 sterling. About two-thirds of the whole kingdom is under cultivation, and nearly eight-ninths profitably occupied, leaving only about one-ninth waste. Of this last the far greater part belongs to the comparatively barren districts of the S.E. and N.E., already described; and hence, in the more favoured provinces, particularly those of South Brabant, the two Flanders, and Hainaut, the quantity of waste is so very small, that the whole surface may be regarded as one vast garden. It is an error, however, to assert, as is usually done, that Belgium raises more corn than it consumes. For many years the import has considerably exceeded the export. Considerable attention has been paid in Belgium to the rearing of stock, and the breeds both of cattle and horses are of a superior description. The horses of Flanders in particular are admirably adapted for draught, and an infusion of their blood has contributed not a little to form the magnificent teams of the London draymen. In general, however, Belgium stock of all kinds is inferior to that of England.

Mines.—The mineral riches of Belgium are great, and, after agriculture, form the most important of her national interests. They are almost entirely confined to the four provinces of Hainaut, Liége, Namur, and Luxemburg, and consist of lead, manganese, calamine or zinc, iron, and coal. The lead is wrought to some extent at Vedrin, in Liége; but the quantity obtained forms only a small part of the actual consumption. Manganese, well known for its important bleaching properties, is obtained both in Liége and Namur. The principal field of calamine is at Liége, where it is worked to an extent which not only supplies the home demand, but leaves a large surplus for export. All these minerals, however, are insignificant compared with those of iron and coal. The former has its seat in the country between the Sambre and the Meuse, and also in the province of Liége. At present the largest quantity of ore is raised in that of Namur. The coal-field, already described, has an area of above 500 square miles. In 1870 the output nearly reached 13,700,000 tons, and upwards of 90,000 persons were employed in the mines. Above 3,100,000 tons were exported, forming one of the largest and most valuable of all the Belgian exports. Nearly the whole of the coal thus exported is taken by France. There cannot be a doubt that this export adds greatly to the national wealth; but a question has been raised as to the policy of thus lavishly disposing of a raw material which is absolutely essential to the existence of a manufacturing community, and the quantity of which, though great, is by no means inexhaustible. One obvious effect of the great foreign demand is to raise the price, and thus place some of the most important manufacturing interests of the country in an unfavourable position for competing successfully with so formidable a rival as Great Britain. Besides minerals, properly so called, Belgium is abundantly supplied with building-stone, pavement, limestone, roofing-slate, and marble. Of the last, the black marble of Dinant is the most celebrated.

Manufactures.—The industrial products of Belgium are very numerous, and the superiority of many of them to those of most other countries is confessed. The fine linens of Flanders, and lace of South Brabant, are of European reputation. Scarcely less celebrated are the carpets and porcelain of Tournay,

the cloth of Verviers, the carriages of Brussels, the cutlery of Namur, the extensive foundries, machine-works, and other iron establishments of Liége. The cotton manufacture, confined chiefly to Flanders and the province of Antwerp, has advanced greatly, upwards of 35,600,000 lbs. of raw cotton having been imported for home consumption in 1868.

Trade and Commerce.—The geographical position, the admirable facilities of transport, and the indefatigable industry of the inhabitants, early combined to place Belgium at the very head of the trading countries of Europe. The gradual rise of competitors still more highly favoured has deprived her of this pre-eminence, and with the limited extent of her sea-coast it is not to be expected that she can ever take high rank as a naval state; but her trade is still of great importance, and within recent years has made a rapid advance. Her coal and iron, and the numerous products of her manufactures, furnish in themselves the materials of extensive traffic; while the possession of one of the best harbours in the world (Antwerp), situated on a magnificent river, which directly, or by canals, stretches its arms into every part of the kingdom, and now made accessible by a system of railways with every kingdom of Central Europe, naturally renders Belgium the seat of a transit trade even more important than that which it monopolized during the middle ages. This she owes chiefly to the admirable system of railway communication which, in the exercise of an enlightened policy, was early established throughout the kingdom. This system has its centre at Malines, from which a line proceeds N. to Antwerp; another W. to Ostend, another S.W. through Mons, and on to the Northern Railway of France, which communicates directly with Paris; and another S.E. to Liége, and on into Prussia, where it first communicates with the Rhine at Cologne, and thence by that river, and by rail, gains access, both E. and S., to all the countries of Central Europe. In addition to these great trunks, one important branch connects Liége with Namur and Mons; and another from Antwerp, after crossing the W. trunk at Ghent, passes Courtray, and proceeds directly towards Lille. The ramification is thus complete; and there is not a town in Belgium of any importance which may not now, with the utmost facility, convey the products of its industry by the safest and the speediest of all means of transport.

From the returns of the external commerce of Belgium it appears that the Belgian trade is steadily advancing. The exports of Belgian produce and manufactures, which in 1840 were to the value of £5,600,000, and in 1849 nearly £9,000,000, had risen to upwards of £27,600,000 in 1870. The total imports for home consumption in the last-named year amounted to £36,830,000. The export and import *transit* trade in the same year amounted to £33,268,000 and £33,576,000 respectively. The articles of export are far more numerous than those of import, the latter being chiefly raw cotton, wool, and colonial produce. The former are principally coal and flax, tissues of flax, cotton, and wool; glass-wares, fire-arms, and nails. The trade with Great Britain in Belgian and British produce has grown considerably of late years; for while in 1860 the exports to Great Britain amounted to £4,079,245, and the imports from Great Britain to £1,610,144, these were in 1870 respectively £11,247,864 and £4,481,079. The chief exports to Great Britain are silk, flax, yarn, and butter; the chief imports woollens and machinery. More than a third of the exports of Belgian produce and manufactures are sent to France. The external trade is chiefly carried on by means of foreign vessels. The total number that entered in 1870 was 5658, with an aggregate burden of 1,575,293 tons; cleared 5406, of 1,534,013 tons. Of the former 866 were Belgian, of the latter 858. Antwerp possesses by far the greater portion of the shipping trade.

People.—The Belgian population is the densest in Europe, and is composed of two distinct races—Flemish, who are of German, and Walloons, who are of French extraction. The former, by far the more numerous, have their principal locality in Flanders; but also prevail throughout Antwerp, Limburg, and part of South Brabant. The latter are found chiefly in Hainaut, Liége, Namur, and part of Luxemburg. The language of each corresponds with their origin—the Flemings speaking a dialect of German, and the Walloons a dialect, or rather corruption, of French, with a considerable infusion of words and phrases from Spanish and other languages. This distinct mixture of races, and the repeated changes of masters to which they have been subjected, have necessarily been very unfavourable to the formation of a national character. Still, in some leading features there is a remarkable uniformity in the population. Though the position of the country between France and Germany has made it the battlefield of Europe, the inhabitants show few warlike tendencies, and are unwearied in pursuing the arts of peace. Hostile armies have frequently met upon their soil to decide the fate of kingdoms, carrying devastation into every quarter; but no sooner have they withdrawn than the labours of the field and the workshop have been quietly resumed, and the very traces of devastation been in a few years effaced. The fact bears strong testimony to the patient endurance of the Belgians, but bespeaks a deficiency both of physical and moral courage, and thus prepares us for another leading feature in their character—their blind and slavish subjection to the Romish see. Protestantism is fully tolerated, and even salaried by the state, but cannot count above one-twentieth of the population among its adherents. One astonishing circumstance connected with this state of matters is, that Belgium early embraced, and at one time seemed on the eve of being gained to, the Reformation. Persecution of the most fearful kind took place, and did what perhaps it has never done in any other part of the world—not only forced the people back to a religion which they had renounced, but induced them to return to it as willing converts. Where such a spirit prevails education of an enlightened kind cannot have made much progress. Numerous schools, partly free and partly supported by the state, are planted throughout the kingdom; but the instruction given is of the most elementary description. Under the Dutch attendance at these schools was compulsory. It has since become voluntary, and is said to have, in consequence, declined. In all the large towns colleges (*athenées*) have been established, where a superior education may be obtained; while a complete course for the learned professions is provided by four universities, two of them, at Ghent and Liége respectively, established and supported by the state; one at Brussels, called the Free University, founded by voluntary association; and one at Louvain, called the Catholic University, founded by the clergy, and apparently the most flourishing of all. Many of the professors in these universities are of distinguished reputation; but their works, written in French, which is still the official language and in general use among the educated classes, can scarcely be regarded as forming part of a national literature. Of late, however, patriotic feelings, to which the Belgians have too long been strangers, have acquired new strength; and one of its first manifestations has been an eager

desire to cultivate the vernacular Flemish. It is said to possess great power and flexibility, and several works have already appeared in it which bid fair to make it a classic language. The population generally is moral, and apparently in comfortable circumstances. The far larger proportion of it is rural; and though property is very much subdivided, the Belgians, instead of exhibiting the wretchedness so common among the small occupiers in Ireland, manage, by a happy combination of agricultural with other industrial employments, to derive from their little tenures all the necessaries and not a few of the comforts of life. It is not to be denied, however, that in some of the provinces, particularly in Flanders, population, in so far at least as it can be maintained by agricultural resources, has reached its limit, and that a deficiency of other employment, particularly spinning and handloom weaving, has placed large numbers on, if not within, the verge of pauperism. In Flanders and South Brabant a fourth of the people is dependent on total or occasional relief; and pauper riots have repeatedly occurred. Still the population continues to move on, as if with accelerated pace. In 1841 it was 4,067,393; and in 1870, as already mentioned, 5,087,105.

Government.—The Belgian constitution combines monarchical with a strong infusion of the democratic principle. The executive power is vested in a hereditary king; the legislative in the king and two chambers—the senate and the chamber of representatives—both elected by citizens paying about 35*s.* of direct taxes, the former for eight years, and the latter for four, but one-half of the former renewable every four years, and one-half of the latter every two years. Each of the provinces is administered by a governor, and is subdivided into *arrondissements administratifs* and *arrondissements judiciaires;* subdivided again, respectively, into *cantons de milice* and *cantons de justice de paix.* Each canton is composed of several communes, of which the sum total throughout the kingdom is 2514. The other great territorial divisions are the ecclesiastical, which divides the kingdom into six dioceses, and the military, which divides it into four sections. According to a law passed in 1868 the army is to consist of 100,000 men on the war-footing, and 40,000 in time of peace; but all citizens between the age of twenty-one and fifty are enrolled in the *garde civique,* and form a militia of 125,000 without, and 400,000 with, the reserve. The defensive power of the kingdom is greatly increased by numerous strong fortresses. The navy of Belgium is confined to a few steamers and a small flotilla of gun-boats. The estimated revenue for 1872, chiefly from railways, direct taxation, and dues of transport, was £7,556,500; the estimated expenditure, £7,337,000. About one-fourth of the revenue is absorbed by the interest of the national debt, the sum total of which is about £33,700,000. The coins, weights, and measures are the same, both in name and value, as those of France.

History.—The history of Belgium as a separate kingdom, beginning in 1830, when it was constituted an independent European state, would not truly represent the life of the people, or account even for the events of the period embraced in it. Situated between the two leading states of Europe, and deeply interested in all the political agitations resulting alike from their rivalries and their alliances, the Belgian people often changed masters. Moreover the Belgian territory contained within itself one leading element of the dissensions which raged around it. The two great races of different origin and habits, the Celtic and Teutonic, or Latin and German speaking peoples, whose different policies have divided Europe from the time of the Romans, were combined in its population, the Walloon provinces, Hainaut, Namur, Luxemburg, being nearly allied to the French, while Flanders, Brabant, and Limburg approximated more in character and language to the Germans. Thus not only were the great rivalries of Europe represented here in miniature, but their compression within the narrow limits of what is now one of the smallest of European states, has resulted in the formation of a distinct national character. While, therefore, the chief events in which Belgium was interested prior to 1830 are matters of European history, a brief outline of them is needed here to give a distinct conception of the character of the people which they contributed to form, and fuller details of many of them will be found under other headings, as GAUL, FRANCE, AUSTRIA, SPAIN, HOLLAND, &c.

The territory anciently known as Belgian differed considerably from that which has assumed the name in modern times. According to Cæsar the territory of the Belgæ, who were one of the principal tribes of ancient Gaul, extended from the right bank of the Seine to the left bank of the Rhine, and to the ocean. This district continued under Roman sway till the decline of the empire, and subsequently formed part of the kingdom of Clovis, who subdued nearly the whole of Gaul from the Rhine to the Mediterranean. The Franks at this time did not recognize the law of primogeniture. On the death of a monarch his dominions were divided among his sons, the more ambitious of whom again strove to reunite them under their own sway. Thus the Frankish kingdoms under the descendants of Clovis were subject to continual vicissitudes, in which the Belgian territory shared, forming successively a portion of the kingdoms of Metz, Soissons, and Austrasia, until the whole was reunited under Charlemagne.

This great conqueror and administrator, the first who strove to unite the states of Europe in a civilized commonwealth, was of Belgian extraction. It was at Landen and Herstal, on the confines of the forest of Ardennes, that his predecessors, the great mayors of the palace, held sway, while his own capital was established at Aix.

Charlemagne in great measure destroyed his own work by adopting the Frankish custom of dividing his kingdom among his sons at his death. This practice, which had proved so disastrous to the dynasty of Clovis, was continued for some time in his family, but was ultimately abolished in France. It long prevailed among the principalities of Germany, hindering their unity, and contributing to the ascendency of France in Europe. Thus Belgium fell to Lothaire, the grandson of Charlemagne, forming part of the kingdom of Lotharingia, which was dependent on the German Empire; but by the treaty of Verdun (843) Artois and Flanders were united to France.

For more than a century this kingdom was contended for by the kings of France and the emperors of Germany. In 953 it was conferred by the Emperor Otto upon Bruno, archbishop of Cologne, who assumed the title of archduke, and divided it into two duchies: Upper Lorraine, containing modern Lorraine, Luxemburg, and the dioceses of Metz, Toul, Verdun, and the Palatinate; and Lower Lorraine, containing Brabant, Guelders, the bishoprics of Cologne, Liége, and Cambray. These duchies were temporarily reunited under Gonthelan I., duke of Lower Lorraine, who acquired Upper Lorraine in 1033. Among the dukes of Lower Lorraine may also be mentioned Godfrey of Bouillon, the great Crusade leader, who in 1099 was crowned King of Jerusalem.

The feudal system, which had established itself over the greater part of Europe, likewise prevailed in the Belgian territory, which in the eleventh cen-

tury was divided into duchies, counties, and marquisates, under the sway of chiefs owing allegiance to the empire, or other of the greater princes, but exercising an almost absolute dominion over their own subjects. Thus were formed the counties of Holland, Brabant, Zealand, Friesland, Namur, Hainaut; the duchies of Limburg, Guelders, Juliers, Luxemburg; the marquisate of Antwerp, and others. In the frequent struggles which took place during this period, Luxemburg, Namur, Hainaut, and Liége were usually found siding with France, while Brabant, Holland, and Flanders commonly took the side of Germany. The princes and the people, however, particularly of Flanders, were not always found on the same side.

The twelfth and thirteen centuries were distinguished by a general uprising of the industrial communities, which had begun to grow in importance throughout Europe, against the feudal system. This movement was very strongly manifested throughout the Netherlands, less strongly perhaps in Belgium than in Holland. In both countries prosperous municipalities began to arise and assert their freedom; but the spirit of centralization, more strongly developed among the Latin-speaking races, prevailed more in the southern provinces, while the love of individual liberty, more characteristic of the German races, was more strongly manifested in the northern. Many of the towns of Flanders and Brabant, however, became extremely democratic. Ghent in particular distinguished itself for the violence and frequency of its revolts against its rulers.

From this time the popular and civic element began to count for something in political combinations. If one potentate secured the alliance of a count, another might strengthen himself by secretly encouraging insurrection in his towns. The people of Flanders often allied themselves with the English, with whom their commercial intercourse and their love of freedom gave them many common interests and feelings, and both their own counts and the French monarchy often felt the effects of this alliance.

The battle of Courtray in 1302 greatly weakened the feudal authority, but the ascendency of the popular element led to various excesses. The organization of popular power was reserved for a later age, and the battle of Rosebeque, 1382, in which the Ghentese under Philip van Artevelde (who had offered the crown of France to Richard II. of England as the price of his assistance) were totally defeated, restored the authority of the nobles.

In 1384, Flanders and Artois fell to the house of Burgundy by the marriage of the duke, a scion of the French crown, with Margaret, daughter of Louis II., count of Nevers, the last ruler of these provinces. By a succession of happy marriages, by purchase, or by force, Holland, Zealand, Hainaut, Brabant, Limburg, Antwerp, and Namur had all by 1430 become the inheritance of the same house. In 1442 the duchy of Luxemburg was acquired, and in 1470 Guelders and Friesland. This extraordinary prosperity induced Charles the Bold, who succeeded in 1467, to attempt to unite his territories by the conquest of Alsace, Lorraine, and Liége, and raise his duchy to a kingdom. The details of this enterprise, which forms one of the most exciting episodes in European history, belong more immediately to the history of France. It ended in his defeat and death at the battle of Nancy in 1477.

His daughter Mary, who succeeded him, carried the fortunes of her house still higher, or rather she carried them into a house still more fortunate than her own, by her union with the Archduke Maximilian, son of the Emperor Frederick. Her splendid possessions had been coveted by many potentates, and there were five candidates for her hand, among whom the most important were the dauphin, son of Louis XI., and the archduke.

It now became the part of France to excite troubles in Flanders. The policy of Maximilian, conformably to the traditions of the house of Austria, was directed to the aggrandizement of his house. He was frequently at feud with his Netherlandish subjects, whose manners he took little pains to understand, and for whose liberties he had little respect. Wars and leagues succeeded each other, which belong to the history of the great states of Europe. The Netherlands were by this union again brought under the German Empire, and especially under the house of Austria, destined soon to become the most powerful in Europe. In 1512 they were formed into a division of the empire, under the title of the circle of Burgundy. East Friesland was included in the circle of Westphalia.

On being called to the empire, Maximilian conferred the government of the Netherlands on his son Philip the Fair, under whom they began to experience the material advantages of an alliance with the house of Austria. The vast European possessions of this house opened up to its subjects the greatest facilities of the age for commercial intercourse, while the discovery of America gave them in addition the commerce of a new world. The industrial skill and enterprise of the Netherlanders fitted them much more than the Spaniards, whose haughty disposition made them apt to substitute rapacity for industry, to derive permanent benefit from these opportunities. Margaret, the aunt, and Mary, the sister of Charles V., who succeeded to the government of the Low Countries, exercised it in many respects wisely and well. The former, a patroness of arts and letters, kept her court surrounded with poets, artists, and men of learning. A council of state, consisting of the governors or stadtholders of the seventeen provinces, assisted them in the administration of affairs, and such was the prosperity of the country, that more than one of the cities of the Netherlands rivalled in extent and opulence the capitals of the greatest European kingdoms.

This bright day was too soon clouded. The reign of Charles V. is less distinguished for the political struggles excited by a too prosperous ambition, which shook nearly every nation of Europe, than for the religious dissensions, and the social troubles resulting from them, which attended the dawn of the Reformation. The reformed opinions made great progress in the Netherlands; but here again a remarkable illustration was afforded of the strength of those differences of race, language, and sentiment which divided their populations. In Holland, as in Germany, the Reformation triumphed. On the Belgian territory, especially where the Walloon or French element of the population prevailed, although these opinions spread widely, they yielded at length, as in France, to the force of authority, or the sentiment of unity. In 1535 Mary published at Brussels an edict condemning all heretics to death. An insurrection excited by persecution was suppressed by Charles V. in 1540, and the Netherlands were inseparably united by the law of primogeniture with the crown of Spain. No union could have been more unfortunate. The bigotry of the Spanish branch of the Austrian family has become proverbial, and a country torn with religious dissensions could not have found itself under a worse rule.

Charles V., himself a Netherlander, born at Ghent, and still more his son Philip II. of Spain, strove to extinguish the reformed opinions among their Netherland subjects in seas of blood. Philip discarded all respect for the liberties of the Netherlands, and sub-

jected them under his governors, particularly the Duke of Alva, to all the horrors of a hostile military rule. Thousands of victims perished by every variety of execution which a barbarous cruelty could devise, hanging, beheading, burning, drowning, interring alive; to which tortures and imprisonments were added in still greater number. During this period of desolation great numbers of artisans, abandoning their country, carried elsewhere, especially to England and Germany, which sympathized with their opinions, the arts which had enriched their own country, and which now acquired through them a wider scope, and contributed to the industrial progress of Europe.

William of Orange, the Silent, now made himself the champion of the liberties of his country. Supported chiefly by the northern states, thwarted by the jealousy of the Flemish nobles, and opposed by the Walloon provinces, which remained faithful to Spain, and even supplied her with troops, he at length succeeded in freeing the seven northern states, and forming them into the confederation of the United Provinces, whose independence, declared in 1581, was ultimately acknowledged by Spain. These events belong chiefly to the history of Holland.

Requesens, the successor of Alva, had tried too late a more humane policy. At Antwerp and Ghent the Spanish soldiers broke out into excesses. The confederates assembled in the latter town signed the pacification of Ghent, proclaiming liberty of conscience, and convoking the estates-general. The estates called in the aid of France, and offered the crown to Henry III., who declined to accept it, dreading the Catholic league in his own country. It is a special feature of the history of those days, that while the great rulers, particularly those of France and Germany, persecuted their reformed subjects, each was ready to protect the Protestant subjects of the others when opposed to their political policy. The success of the revolutionary party, consummated in the north, was at length checked in the southern provinces by the ability of Alexander Farnese, duke of Parma, the Spanish commander, and by the reactionary spirit evoked in the provinces themselves, strengthened by the emigration of many influential reformers to the northern states, and the Belgian Netherlands remained attached to Spain.

From 1596 to 1633 the Spanish Netherlands were transferred to the Austrian branch of the family by the marriage of Isabella, daughter of Philip II., with the Archduke Albert of Austria. On the death of Isabella they reverted to Spain. By the treaty of Rastadt in 1714 they were again placed under the dominion of Austria. During this period they were the subject of continual intrigues, and frequently of open warfare among the European states. Twice conquered by Louis XIV., conquered again by Marlborough, coveted by Holland, Spain, Germany, France, and England, they lay continually open to the invasions and the struggles of foreign armies, and it was at this period especially that they were, as they have been called, the battlefield of Europe. Some portions of Maritime Flanders, Brabant, and Limburg, which had remained to Spain, were during this period conquered and annexed by Holland, while France acquired Artois and Walloon Flanders, the south of Hainaut, and part of Namur and Luxemburg, including the important towns of Douai, Lille, Valenciennes, Dunkirk, and many others.

From 1714 Austria was left in undisturbed possession of the remainder of the Southern Netherlands. Joseph II., styled the Philosophical Emperor, excited by his reforms a revolt, headed or stimulated by the monks of Flanders and Brabant, whom he had dispossessed of their convents. The estates of the two provinces refused to vote the imposts, and were dissolved. The populace took to arms. The Virgin was proclaimed generalissimo of the patriot army. The Austrian army concentrated at Turnhout was totally defeated. After applying in vain for assistance to Holland and France, neither of which could be expected to have much sympathy with their movement, the insurgents were at length subdued, and the Austrians re-entered Brussels, October, 1790.

Soon after the whole Netherlands were conquered by the revolutionary armies of France, and the country was divided into French departments, a change which, as might be expected, provoked as much resistance as the people were able to offer. When Napoleon ruled France, his brother Louis became King of Holland.

When the battle of Waterloo, fought on Belgian territory, had once more changed the fate of Europe, Belgium was united by the treaty of Paris to Holland, under the title of the Kingdom of the Netherlands. This fusion had much to recommend it. The ports and colonies of the north formed a suitable compliment to the arts and industry of the south. The Flemings and the Dutch spoke the same language and had the same origin; but there remained outside of this harmony the Walloon provinces, French in language and extraction. A most injudicious measure of the Dutch government, an attempt to assimilate the language of the provinces by prohibiting the use of French in the courts of justice, excited an opposition, which, encouraged by the success of the French revolution of 1830, broke out into revolt. The electoral system, moreover, gave the preponderance to the northern provinces, though inferior in population, and the interests of the provinces were diametrically opposed in matters of taxation. Belgium was agricultural and manufacturing, Holland commercial; the one wished to tax imports and exports, the other property and industry. In the chambers three different languages were spoken, Dutch, German, and French; and the members frequently did not understand each other. Nothing but the most skilful government could have overcome these difficulties, and no statesman appeared fitted to grapple with them. The revolutionary movement became general in the south, and the Dutch troops, at first successful before Brussels, were finally repulsed, and compelled by the arrival of fresh bands of insurgents from all quarters to retire. The Flemings saluted the volunteers of Liége, Mons, and Tournay by the ancient title of Belgians, and this name, which properly distinguished only a section of the people of the southern provinces, became henceforth recognized as the patriotic designation of the whole.

A convention of the great powers assembled in London, to determine on the affairs of the Netherlands, and stop the effusion of blood. It favoured the separation of the provinces, and drew up a treaty to regulate it. In the meantime the National Congress of Belgium offered the crown to the Duke of Nemours, second son of Louis Philippe, and, on his declining it, they offered it, on the recommendation of England, to Leopold, prince of Saxe-Coburg, who acceded to it under the title of Leopold I., on July 21, 1831. In November of the same year the five powers guaranteed the crown to him by the treaty of London. Some disputes with Holland in regard to the partition of territories still remained. A convention was concluded between France and England to bring these differences to a close, and in 1839 Holland acceded to a treaty, by which Belgium surrendered to her portions of Limburg and Luxemburg, which she had retained since 1830.

During the reign of Leopold, a prosperous period of thirty-four years, Belgium became a united and patriotic community. Arts and commerce flourished,

and a place was taken in the family of nations upon which the Belgian people could look with complacency. On the outbreak of the French revolution of 1848 Leopold declared his willingness to resign the crown if it was contrary to the wishes of his subjects that he should retain it. This declaration disarmed the Republican party, and confirmed the stability of the monarchy at a critical moment. During his reign Belgium concluded various treaties of commerce, with Great Britain in 1851 and 1862, and with France in 1861.

Leopold II. succeeded his father in 1865. In 1870 a treaty was signed in London between England, Prussia, and France confirming the independence of Belgium, and guaranteeing its neutrality in the war between France and Prussia. The volunteer movement in both countries has given rise to much cordial intercourse between Belgium and England, thus reviving the old partiality of the Flemings towards the latter country.

BELGRADE (anciently *Singidunum*), a fortified city of European Turkey, capital of the principality of Servia, on the right bank of the Danube at the junction of the Save with that river, on the declivity of a hill. It is composed of the citadel, rising in the centre, and situated on a rock 100 feet high; the lower town; the Turkish quarter; and the Servian quarter. The houses are in general very mean; the streets filthy in the extreme, and infested by swarms of half-famished dogs; and the shops consist mostly of a series of wooden stalls or booths, open towards the street, and in general poorly stocked. The only public buildings worthy of notice are the academy, the college, the senate-house, and the two bazaars, the residence of the reigning prince, the cathedral, and the barracks. Belgrade was at one time strongly fortified, and might be rendered almost impregnable. The outworks are still kept in good repair. The fortress was considerably strengthened during the Crimean war. Within the fortress are the arsenal and magazines erected by the Austrians, and the principal mosque, with its lofty tower. The principal articles of manufacture are carpets, silk stuffs, hardware, cutlery, and saddlery; but the quantities produced are inconsiderable compared to what they were in former times, when Belgrade was celebrated for the extent of its manufactures. From the excellence of its port, formed by three islands in the Danube above the town, and its favourable position on the Danube, which gives it an easy communication with the Black Sea, it still carries on a pretty extensive trade. The military experiences of Belgrade have rendered it famous in history. Being the key of Hungary, it was long an object of fierce contention between the Austrians and the Turks. It was besieged by the latter in 1456, and taken by them in 1521, from which time it was held by them till 1688, when it was retaken by the imperial army. Two years afterwards it was again captured by the Turks, who perpetrated every sort of atrocity in the conquered city, besides killing 1200 of the garrison. In 1693 the Austrians made an unsuccessful attempt to regain the town, sustaining a loss of 1000 men. From this period it remained in possession of the Turks till the year 1717, when it was besieged by Prince Eugene, with an army of 90,000 men; the Turkish garrison, amounting to 25,000 men, was supported by a strong flotilla on the Danube, and subsequently by an army of 200,000 men, under the grand vizier, who marched to the relief of the city. After a desperate conflict between the contending armies the Turks were defeated with a loss of 13,000 killed, 5000 wounded, and 3000 prisoners; the Austrians having only 3000 killed and 4500 wounded. In 1739 the Turks made another vain attempt to retake Belgrade, but came the same year into possession of it by treaty, retaining it till 1789, when it was taken by the Austrians. It was restored by treaty to the Turks in 1791; since which time it has shared the varying fortunes of Servia. In consequence of a quarrel with the Servians it was bombarded by the Turkish garrison in 1862. In 1867 it was evacuated by the Turks altogether. Pop. 25,869.

BELIAL. By the translators of the English Bible, this word is often treated as a proper name, as in the expressions 'son of Belial,' 'man of Belial.' In the Old Testament, however, it ought not to be taken as a proper name, but it should be translated 'wickedness' or 'worthlessness.' Hence a 'man of Belial' is synonymous with a 'wicked' or 'worthless man.' To the later Jews Belial seems to have become what Pluto was to the Greeks, the name of the ruler of the infernal regions; and in 2 Cor. vi. 15 it seems to be used as a name of Satan, as the personification of all that is bad.

BELISARIUS, one of the greatest generals of his time, to whom the Emperor Justinian chiefly owed the splendour of his reign. Sprung from an obscure family in Thrace, Belisarius first served in the body-guard of the emperor, soon after obtained the chief command of an army of 25,000 men stationed on the Persian frontiers, and in the year 530 gained a complete victory over a Persian army of not less than 40,000 soldiers. The next year, however, he lost a battle against the same enemy, who had forced his way into Syria—the only battle which he lost during his whole career. He was recalled from the army, and soon became at home the support of his master. In the year 532 civil commotions, proceeding from two rival parties, who called themselves the *green* and the *blue*, and who caused great disorders in Constantinople, brought the life and reign of Justinian into the utmost peril, and Hypatius was already chosen emperor, when Belisarius with a small body of faithful adherents restored order. Justinian, with a view of conquering the dominions of Gelimer, king of the Vandals, sent Belisarius with an army of 15,000 men to Africa. After two victories he secured the person and treasures of the Vandal king. Gelimer was led in triumph through the streets of Constantinople, and Justinian ordered a medal to be struck, with the inscription *Belisarius gloria Romanorum*, which has descended to our times. By the dissensions existing in the royal family of the Ostrogoths (see GOTHS) in Italy, Justinian was induced to attempt to bring Italy and Rome under his sceptre. Belisarius vanquished Vitiges, king of the Goths, made him prisoner at Ravenna (540), and conducted him, together with many other Goths, to Constantinople. The war in Italy against the Goths continued; but Belisarius, not being sufficiently supplied with money and troops by the emperor, demanded his recall (548). He afterwards commanded in the war against the Bulgarians, whom he conquered in the year 559. Upon his return to Constantinople he was accused of having taken part in a conspiracy. But Justinian was convinced of his innocence, and is said to have restored to him his property and dignities, of which he had been deprived. Belisarius died in the year 565. His history has been much coloured by the poets, and particularly by Marmontel, in his otherwise admirable politico-philosophical romance. According to his narrative, the emperor caused the eyes of the hero to be struck out, and Belisarius was compelled to beg his bread in the streets of Constantinople. Other writers say that Justinian had him thrown into a prison, which is still shown under the appellation of the *Tower of Belisarius*. From this tower he

is reported to have let down a bag fastened to a rope, and to have addressed the passengers in these words:—*Date Belisario obolum, quem virtus evexit, invidia depressit* (Give an obolus to Belisarius, whom virtue exalted, and envy has oppressed). Of this, however, no contemporary writer makes any mention. Tzetzes, a slightly-esteemed writer of the twelfth century, was the first who related this fable. Certain it is, that, through too great indulgence towards his wife Antonina, Belisarius was impelled to many acts of injustice, and that he evinced a servile submissiveness to the detestable Theodora, the wife of Justinian.

BELKNAP, JEREMY, an American clergyman and author of considerable reputation. He was born in June, 1744, graduated at Harvard College in 1762, and ordained pastor of the church in Dover, New Hampshire, in 1767. Here he spent twenty years in the diligent performance of his clerical duties and the cultivation of literature. It was during this period that he composed his History of New Hampshire, a work by which he established himself as an author in the good opinion of his countrymen. In 1787 he took charge of a church in Boston, where he continued to officiate until his death, in 1798. Besides his History he published two volumes of his unfinished American Biography, and a number of political, religious, and literary tracts.

BELL. The metal from which bells are usually made is an alloy of copper and tin called bell-metal. It is commonly composed of eighty parts of copper and twenty of tin. The Indian gong, so much celebrated for the richness of its tones, contains copper and tin in this proportion. The proportion of tin in bell-metal varies, however, from one-third to one-fifth of the weight of the copper, according to the sound required, the size of the bell, and the impulse to be given. M. d'Arcet discovered that bell-metal, formed in the proportion of seventy-eight parts of copper united with twenty-two of tin, is, indeed, nearly as brittle as glass, when cast in a thin plate or gong; yet if it be heated to a cherry red, and plunged into cold water, being held between two plates of iron, that the plate may not bend, it becomes malleable. Gongs, cymbals, and tamtams have been manufactured with this compound. The clearness and richness of the tone of a bell depend not only on the metal which is used, and the perfection of its casting, but also upon its shape; and it has been shown by a number of experiments made for this purpose, that the well-known shape with a thick lip is the best adapted to give a perfect sound. The depth of the tone of a bell increases in proportion to its size. A bell is divided into the body or barrel, the ear or cannon, and the clapper. The lip or sound bow is that part where the bell is struck.

Church-bells originated in Italy, being formed by degrees out of the cymbals, small tinkling bells and hand-bells of the East used in religious ceremonies as a means of honouring the gods or of summoning them to the feast. The feast of Osiris, particularly, is known to have been announced by bells, and in Athens the priests of Cybele made use of them at their sacrifices. Pliny says that bells were invented long before his time. They were called *tintinnabula;* and Suetonius tells us that Augustus caused one to be hung before the temple of Jupiter. Among Christians they were first employed to call together religious congregations, for which purpose runners had been employed before. Afterwards the people were assembled by the sound of little pieces of board struck together; hence called *sacred boards*. To the present day the Catholics use such boards in Passion-week and Lent, because the noise of bells seems to them unsuited to the solemnity of the season. On the first day of Easter the bells ring again, and the return of the accustomed sound produces a very cheerful effect. Paulinus, bishop of Nola, in Campania, is said to have first introduced church-bells in the fourth century, and thence the Latin names of the bell, *campana* and *nola*, are said to have originated. In the sixth century bells were used in the convents; they were suspended on the roof of the church in a frame. Towards the end of this century bells were placed on some churches at the expense of certain cities. About 550 they were introduced into France. Pope Sabinian, who died in 606, first ordered that the hours of the day should be announced by striking the bell, that people might better attend to the *horæ canonicæ*, that is, to the hours for singing and praying. In 610 Clothair besieged Sens, when Lupus, bishop of Orleans, ordered the bells of St. Stephen to be rung. The sound so frightened Clothair that he gave up the siege. In the eighth century the custom of baptizing and naming bells began. (See BAPTISM.) Church-bells were probably introduced into Britain soon after their invention. They are first mentioned by Bede, about the close of the seventh century. In the East they came into use in the ninth century; in Switzerland in 1020; at what period they were brought into Germany is uncertain. In the eleventh century the cathedral at Augsburg had two bells. The same spirit which induced people to build immense minsters, and to apply their wealth in ornamenting the places of worship, made them vie with each other in the size of their bells. The great bell of Moscow, cast in 1653, in the reign of the Empress Anne, is said by Mr. Clarke to be computed to weigh 443,772 lbs. A bell in the church of St. Ivan, in the same city, weighs 127,836 lbs.; another, 39,872 lbs.; and the one cast in 1819 weighs 112,000 lbs., the clapper alone weighing 2016 lbs. On the cathedral of Paris a bell was placed in 1680 which weighed 38,800 lbs. and measured 25 feet in circumference. In Vienna a bell was cast in 1711 of 39,648 lbs. In Olmütz is one of 40,096 lbs. The famous bell at Erfurt, in Germany, called 'Maria Gloriosa,' which was cast in 1497 from the metal of the former bell 'Susanna,' melted at the burning of the cathedral in 1472, weighs 30,800 lbs., is more than 24 feet in circumference, and has a clapper of 4 feet, weighing 1232 lbs. 'Great Tom,' of Christ Church, Oxford, weighs 17,000 lbs.; of Lincoln, 9894 lbs.; the bell of St. Paul's, London, 8400 lbs.; a bell at Nankin, in China, is said to weigh 50,000 lbs.; and seven at Pekin 120,000 lbs. each. The practice of hanging bells in houses is comparatively a modern one, having been introduced into England since the time of Queen Anne. The inscriptions on old bells are curious, and in some cases have even historical value; and at this time, when curiosities of all kinds are eagerly sought for, a collection of these inscriptions would not be uninteresting. The different uses of bells have given rise to many poems, some of which are inscribed on the bells themselves. One of the most common is the following:—

'Funera plango, fulgura frango, sabbata pango;
Excito lentos, dissipo ventos, paco cruentos.'

Perhaps the finest poem which has ever been written on bells is Schiller's poem, Die Glocke (The Bell), in which he describes the casting of the bell, and all its uses, in a highly poetical manner. This has been translated into many modern languages, and also into Greek and Latin, by a professor at Liége. The word *bell* is used in many arts and sciences for instruments similar in form to church-bells. See CHIMES and CURFEW.

BELL, ANDREW, D.D., the author of the mutual instruction or 'Madras' system of education, was born at St. Andrews in 1753, and was educated at the university of his native town. Having taken orders in the Church of England he visited America, and in 1789 went to India, where he became chaplain at Fort St. George, Madras, and manager of the institution for the education of the orphan children of European soldiers. In that year the directors of the East India Company sent out orders to Madras that a seminary should be established there for the education and maintenance of the orphans and distressed male children of the European military. The superintendence of this asylum was undertaken by Dr. Bell, who, having no object in view but the gratification of his benevolence, refused the salary of 1200 pagodas (£480) which was attached to it. Failing to retain the services of properly qualified ushers, he resorted to the expedient of conducting his school through the medium of the scholars themselves. It is in the mode of conducting a school by means of mutual instruction that the discovery of Dr. Bell consists; and its value as an abbreviation of the mechanical part of teaching, and where large numbers were to be taught economically, could not be easily overestimated at the time, although later educationalists have improved upon the plan, and the Madras system is less in use than formerly. From the commencement of his experiment he made the scholars, as far as possible, do everything for themselves; they ruled their own paper, made their own pens, &c., while the teacher only directed them. The maxim of the school was, that no boy could do anything right the first time, but he must learn when he first set about it, by means of his teacher, so as to be able to do it himself ever afterwards. After superintending the school for seven years he found it necessary for his health to return to Europe. On his arrival he published in 1797 a pamphlet, entitled, An Experiment in Education made at the Male Asylum of Madras, in which he gave an account of his system. The first place in England where the system was adopted was the charity school of St. Bodolph's, Aldgate, and gradually, especially through the influence of Joseph Lancaster, it was very widely carried out in England and elsewhere. Dr. Bell lived long enough to witness the introduction of his system into 12,973 national schools, educating 900,000 of the children of his English countrymen, and to know that it was employed extensively in almost every other civilized country. He acquired in later life the dignity of a prebendary of Westminster, and was master of Sherborn Hospital, Durham. He employed himself during his latter years in writing several works on education, among which the most valuable were, The Elements of Tuition, The English School, and Brief Manual of Mutual Instruction and Discipline. The latter years of his life were passed at Cheltenham, where he died Jan. 27, 1832. Before his death he bestowed £120,000 three per cent. stock, for the purpose of founding an academy in his native city.

BELL, BENJAMIN, an eminent surgeon, was born at Dumfries in 1749. He early made choice of medicine as a profession; and after serving an apprenticeship to Mr. Hill, surgeon in Dumfries, he repaired in 1766 to Edinburgh for the further prosecution of his studies. In 1770 he visited Paris and London, the two great schools for surgical practice. Before doing so, however, he passed the examinations at Surgeons' Hall, and was admitted a member of the Royal College of Surgeons, Edinburgh. In 1772 he commenced practice in Edinburgh. In the year 1778, about six years after he had finally settled in Edinburgh, and become established in practice, the first volume of his system of surgery was given to the world. The remaining volumes appeared from time to time, until the work was completed in six volumes 8vo, in 1788. It has had a very extensive sale; the last edition, being the seventh, considerably improved, was published at Edinburgh in 1801 in seven volumes. In 1793 appeared his Treatise on Gonorrhœa, and in 1794 another Treatise on Hydrocele. He died April 4, 1806.

BELL, SIR CHARLES, the son of an Episcopal clergyman, the Rev. William Bell, was born at Edinburgh in 1774, studied anatomy there under the superintendence of his brother John (see below), and had scarcely reached manhood before he had proved himself to be a first-rate anatomist and an eminent lecturer. In 1804 he went to London, and worked his way slowly but surely, at a time when he had to compete with a number of the ablest and most original-minded men whom his profession has produced. In 1814 he was appointed surgeon to the Middlesex Hospital, to whose prosperity he afterwards greatly contributed. In 1821 he communicated to the Royal Society a paper on the nervous system, containing the important discoveries on which his fame chiefly rests. It at once attracted general attention, established his reputation, and was doubtless the main ground on which, on the accession of William IV., he was selected for the honour of knighthood. In 1824 he accepted the chair of anatomy and surgery to the London College of Surgeons, and in 1836 that of surgery in the University of Edinburgh. This latter situation he had accepted in the hope of spending his latter years among his early friends, and at the same time enjoying abundant leisure for the prosecution of his favourite pursuits. In 1842 he set out for London, but had only reached the seat of his friend Mr. Holland, of Hallow Park, when he was cut off by *angina pectoris*. His principal works are Anatomy of Expression; System of Operative Surgery; Anatomy and Physiology, partly the work of his brother John; Animal Mechanics, written for the Society for the Diffusion of Useful Knowledge; and the Bridgewater Treatise on the Hand.

BELL, GEORGE JOSEPH, brother of Sir Charles and John Bell (see both names), an eminent lawyer, was born in Edinburgh in 1770, passed advocate in 1791, and though he never rose high in practice, soon distinguished himself and became one of the first authorities on the subject of mercantile jurisprudence. This distinction he earned for himself by the publication of a work which first appeared in 1804, in two vols. 8vo, under the title of a Treatise on the Laws of Bankruptcy, but in subsequent editions was extended to two large vols. 4to, and changed its name to Commentaries on the Laws of Scotland and on the Principles of Mercantile Jurisprudence. This work, notwithstanding recent changes in the law, is still a standard, and was described by the late Sir Samuel Romilly as one of the best, if not the very best, law-book that had appeared in his time. In 1821 Mr. Bell was appointed to the chair of Scots law in the University of Edinburgh, and in 1831 obtained the more lucrative office of a principal clerk of session. He died in 1843. Besides the work above-mentioned, he published Principles of the Law of Scotland, which has gone through several editions; and a kind of sequel to it, entitled, Illustrations of the Principles, consisting of condensed reports of decided cases, both Scotch and English.

BELL, HENRY, the first successful applier of steam to the purposes of navigation in Europe, was born at Torphichen in Linlithgowshire, April 7, 1767. In 1787 he engaged with Mr. James Inglis, engineer at Bell's Hill, with the view of completing his knowledge of mechanics. He afterwards went

to London, but about the year 1790 he returned to Scotland, and practised for several years, at Glasgow, the craft of a house-carpenter. In 1808 he removed to Helensburgh, where he continued to prosecute his favourite task of mechanical scheming, without much regard to the ordinary affairs of the world.

The application of steam to navigation was first attempted by the late Mr. Miller of Dalswinton, who, in 1788, at the suggestion of Mr. James Taylor, a preceptor in the family, erected a vessel, which he propelled by this means, upon a loch on his own property in Dumfriesshire. Some further experiments were made by this gentleman and others, and although they did not fail to establish the practicability of steam navigation, yet the scheme lay dormant for several years; when Henry Bell, of Helensburgh, turned his attention to the subject, and in January, 1812, produced a vessel of 40 feet in length, which was found in a great measure to answer the purpose contemplated. This vessel could make way against a head tide in the river at the rate of 7 miles an hour; and it is due to the memory of the projector, that, though he did not obtain a patent, his invention has been found susceptible of very little improvement by later and more skilful engineers. It may be mentioned, that Mr. Robert Fulton, an American engineer, had launched a boat upon this principle in 1807, and that it performed long voyages upon the Hudson River; but it has been proved that Fulton had derived assistance in the construction of his vessel from Bell, who must therefore be allowed the praise of having done, in his own country, what all other men, notwithstanding the superior advantages of skill and capital, had failed in doing. Bell lived to see the bosom of the Clyde dotted far and wide by innumerable copies of his own invention; he lived to know that steam-boats promised to give a new turn to the art of general warfare; he lived to behold numerous secluded parts of his own country subjected by means of these light wanderers of the deep to the blessings of commerce and civilization, which could not have otherwise reached them for centuries; yet he reaped for himself little advantage. While mankind at large were enjoying the blessings which he had pointed out to them, he approached the confines of old age with the prospect of hardly the average comforts which attend that stage of existence in the humbler walks of society. Touched by his condition, a number of benevolent individuals instituted a subscription in his behalf, and it is creditable to the good feeling of the citizens of Glasgow and other places that a considerable sum was raised. The trustees on the river Clyde also gave Mr. Bell an annuity of £100, which he enjoyed for several years, the half of which sum was continued to his widow. Bell died at Helensburgh on the 14th Nov., 1830. A monument was erected to his memory at Dunglass Point on the Clyde.

BELL, JAMES, an eminent geographical writer, was born at Jedburgh, 1769, and removed with his father to Glasgow in 1777, where, after receiving a liberal education, he served an apprenticeship to the weaving business, and in 1790 commenced the manufacturing of cotton goods upon a large and respectable scale. In the universal depression occasioned by the shock of the French revolution in 1793, Mr. Bell lost his all, and was reduced to the condition of a common warper; but having relinquished that line of life, he was about the year 1815 engaged to improve the Glasgow System of Geography, an original work in two vols., which had met with considerable encouragement, and was now, chiefly by the labours of Mr. Bell, extended to five vols. It was well received by the public, and formed the basis of his principal work, A System of Popular and Scientific Geography, published at Glasgow in six vols. His Gazetteer of England and Wales was in the course of publication at the time of his death. He died in 1833.

BELL, JOHN, of Antermony, in Scotland, was born on his paternal estate in 1691, and after receiving a classical education, turned his attention to the study of medicine. Having gone to St. Petersburg in 1714, after the completion of his studies, he happened to be in that city when an embassy was being sent to the Sophy of Persia, and was appointed medical attendant to the ambassador. On his return from Persia to the Russian capital in 1718 he found there was another embassy preparing to set out for China, and through the influence of the ambassador whom he had attended to Persia he obtained an appointment in it also. The embassy arrived at Pekin 'after a tedious journey of exactly sixteen months.' Mr. Bell has left a very full account of occurrences during his residence in the capital of China. The embassy left that city on the 2d of March, 1721, and arrived at Moscow on the 5th of Jan., 1722. The war between Russia and Sweden was now concluded, and the czar had determined to undertake an expedition into Persia, at the request of the sophy, to assist that prince against the Afghans, his subjects, who had seized upon Kandahar and possessed themselves of several provinces on the frontiers towards India. Mr. Bell's former journey to Persia gave him peculiar advantages, and he was accordingly engaged to accompany the army to Derbend, from which he returned in December, 1722. Soon afterwards he revisited his native country, and returned to St. Petersburg in 1734. In 1737 he was sent to Constantinople by the Russian chancellor, and Mr. Rondeau, the British minister at the Russian court. He seems now to have abandoned the public service, and to have settled at Constantinople as a merchant. About 1746 he married Mary Peters, a Russian lady, and determined to return to Scotland. He spent the latter part of his life on his estate, where he died on the 1st of July, 1780. The only work written by Mr. Bell is his Travels from St. Petersburg in Russia to Various Parts of Asia.

BELL, JOHN, a distinguished surgeon in Edinburgh, was born in that city in 1763. After completing his professional education he travelled for a short time in Russia and the N. of Europe; and on his return began to deliver lectures on surgery and midwifery. These lectures, which he delivered between the years 1786 and 1796, were very highly esteemed, and speedily brought him into practice as a consulting and operating surgeon. The increase of his private practice, indeed, rendered it necessary for him in 1796 to discontinue his lectures, and from that time forward he devoted himself to his patients, and to the preparation of the several publications of which he was the author.

For upwards of twenty years Mr. Bell may be said to have stood at the head of his profession in Edinburgh as an operator. Patients came to him from all quarters, both of Scotland and England, and even from the Continent; and during that interval he performed some of the most delicate and difficult operations in surgery. Early in 1816 he was thrown by a spirited horse, and appears never to have entirely recovered from the effects of the accident. In the autumn of that year he made an excursion, partly on account of his health, to London; thence he proceeded to Paris, and afterwards pursued his journey southwards, visiting the most distinguished cities of Italy. During his residence on the Continent he was treated in the most flattering manner by the members of his own profession; and

his countrymen, who after the peace of 1815 had gone to the Continent in great numbers, gladly took his professional assistance. In Paris, Naples, and Rome in particular, his numerous patients occupied him perhaps too exclusively: for his health continued to decline, and he died at Rome, April 15, 1820, in the fifty-seventh year of his age.

The following is a complete list of his professional works:—(1) The Anatomy of the Human Body (three vols., 1793 to 1802; third edition, with plates by Charles Bell, three vols. 8vo, 1811). (2) Engravings of the Bones, Muscles, and Joints, illustrating the first volume of the Anatomy of the Human Body, drawn and engraved by himself (royal 4to, 1794, third edition). (3) Engravings of the Arteries, illustrating the second volume of the Anatomy of the Human Body (royal 4to, 1801; third edition, 8vo, 1810). (4) Discourses on the Nature and Cure of Wounds (8vo, 1795; third edition, 1812). (5) Answer for the Junior Members of the Royal College of Surgeons to the Memorial of Dr. James Gregory to the Managers of the Royal Infirmary (8vo, 1800). (6) The Principles of Surgery (three vols. 4to, 1801–8). (7) Letters on Professional Character, &c. His Observations on Italy is a posthumous work, which was edited by the late Bishop Sandford of Edinburgh.

BELLA, Stefano Della, an engraver, born at Florence in 1610. He followed at first Callot's manner, but soon adopted one of his own. In 1642 he went to Paris, where he was employed by Cardinal Richelieu. He returned to Florence, and became the teacher in drawing of Cosmo, the son of the great duke, and died in 1664. It is said that he engraved 1400 plates.

BELLADONNA. See Nightshade.

BELLAMY, James, a Flemish poet, was born at Flushing in the year 1757, and died in 1786. He was twenty-five years old, and followed the trade of a baker, when, in the year 1772, the second secular festival in commemoration of the foundation of the republic was celebrated throughout Holland. His genius, suddenly inflamed by the love of his native land, rendered him a poet, and his first productions met with success. He studied Latin, made himself better acquainted with his mother tongue, and composed several pieces of merit sufficient to induce the Society of Arts at the Hague to incorporate them in their collections. In 1785 he published his patriotic songs under the title Vaderlandsche Gezangen, which secure him a place among the first poets of his nation. Bellamy sung likewise the praise of love. The later works of this poet betray a certain melancholy, which renders them still more interesting. A biographical account of him has been written by G. Kniper. He may be placed by the side of Bilderdyk, Helmers, Loots, R. Feyth, &c., as one of the restorers of modern Dutch poetry.

BELLARMINO, Roberto, a cardinal and celebrated controversialist of the Roman Church, was born at Monte Pulciano in Tuscany in 1542. At the age of eighteen he entered into the College of Jesuits, where he soon distinguished himself; and his reputation caused him to be sent into the Low Countries to oppose the progress of the reformers. He was ordained a priest in 1569 by Jansenius, bishop of Ghent, and placed in the theological chair of the University of Louvain. After a residence of seven years he returned to Italy, and was sent by Sixtus V. to France, as companion to the legate. He was made a cardinal on account of his learning, by Clement VIII., and in 1602 created Archbishop of Capua. At the elections of Leo XI. and Paul V. he was thought of for the pontificate, and might have been chosen had he not been a Jesuit. Paul V. recalled him to Rome, on which he resigned his archbishopric without retaining any pension on it as he might have done. In 1613 he left his apartments in the Vatican, and returned to a house of his order, where he died in 1621. So impressed were the people with the idea of his sanctity that it was necessary to place guards to keep off the crowd which pressed round to touch his body or procure some relics of his garments. Bellarmino had the double merit with the court of Rome of supporting her temporal power and spiritual supremacy to the utmost, and of strenuously opposing the reformers. The talent he displayed in the latter controversy called forth all the similar ability on the Protestant side; and for a number of years no eminent divine among the reformers failed to make his arguments a particular subject of refutation. The great work which he composed in this warfare is entitled A Body of Controversy, written in Latin, the style of which is perspicuous and precise, without any pretension to purity or elegance. He displays a vast amount of Scriptural learning, and is deeply versed in the doctrine and practice of the church in all ages, as becomes one who determines every point by authority. To his credit he exhibits none of the lax morality of his order, and in respect to the doctrines of predestination and efficacious grace, is more a follower of St. Augustine than a Jesuit. His maxims on the right of pontiffs to depose princes caused his work on the temporal power of the popes to be condemned at Paris. On the other hand, it did not satisfy the court of Rome, because it asserted, not a direct, but an indirect, power in the popes in temporal matters; which reservation so offended Sixtus V., that he placed it among the list of prohibited books. His society thought so highly of his sanctity, that proofs were collected to entitle him to canonization; but the fear of giving offence to the sovereigns whose rights he oppugned has always prevented a compliance with the ardent wishes of the Jesuits. His controversial works were published at Prague in 1721, and again at Mayence in 1842. Of his other works the most important is his Christianæ Doctrinæ Applicatio (Rome, 1603)—a work originally composed in Italian, but since translated into all European languages. Editions of his complete works have appeared at Venice (five vols., 1721) and Cologne (seven vols., 1619).

BELLART, Nicolas François, a celebrated French advocate, born at Paris in 1761, became a member of the bar in 1788, and during the course of the revolution was employed in a great number of political causes, in which he was generally successful. In 1814 he was a member of the Municipal Council of Paris, and was mainly instrumental in carrying the address which led to the downfall of Napoleon and the recall of the Bourbons. In 1815 he sat in the chamber of deputies, but, as has often happened in the British Parliament, the eloquence which had been all but irresistible at the bar became almost powerless in the senate, and he failed to make any distinguished figure. He died in 1826. His works have been collected, and contain many pleadings remarkable for their eloquence.

BELLE-ALLIANCE. See Waterloo.

BELLEGARDE, Gabriel du Pac de, born at the palace of Bellegarde in the year 1717; a most indefatigable compiler of history, who has thrown much light on the historical events of the seventeenth century.

BELLE-ISLE, or Belle-Isle-en-Mer (anciently *Vindilis*), an island in the Bay of Biscay, 115 miles from the w. coast of France, about 9 miles long, and from 2 to 4 broad, surrounded by sharp rocks which leave only three fortified passages to the island. The

soil is diverse, consisting of rock, salt marsh, and fertile grounds. Palais is the capital. It contains three other small towns and many villages. Lon. 3° 6′ W.; lat. 47° 18′ N. Pop. 10,000.

BELLE-ISLE, or BELLISLE, an island, 15 miles N. Newfoundland and N.E. of the Gulf of St. Lawrence, about 21 miles in circuit. On the N.W. side it has a small harbour fit for small craft, called Lark Harbour, within a little island which lies close to the shore. At the E. point it has another small harbour or cove that will only admit fishing shallops; from whence it is about 16 miles to the coast of Labrador. The narrow channel between Newfoundland and the coast of Labrador is called the Straits of Belle-isle.

BELLEISLE, CHARLES LOUIS AUGUSTE FOUQUET, COUNT DE, Marshal of France, born at Villefranche, Sept. 22, 1684, distinguished himself during the famous siege of Lille, and became brigadier in the royal forces. After the conclusion of the war of the Spanish succession he went with Marshal Villars to Rastadt, where he displayed diplomatic talents. The cession of Lorraine to France in 1736 was principally his work. Cardinal Fleury reposed confidence in him; Louis XV. made him Governor of Metz and the three bishoprics of Lorraine, which office he held until his death. Before the breaking out of the war in 1741 he visited the principal courts of Germany with the design of disposing them, after the death of Charles VI., to choose the Elector of Bavaria Emperor of Germany; and he displayed so much address on this occasion as to excite the admiration of Frederick II. After his return he placed himself, together with Broglio, at the head of the French forces to oppose those of Maria Theresa. He took Prague by assault; but the King of Prussia having made a separate peace, he was compelled to a retreat, which he performed with admirable skill. In Dec. 1744, when on a diplomatic journey to Berlin, he was arrested at Elbingerode, a Hanoverian post, and sent to England, where he was exchanged, however, in 1746. In the following year he forced General Browne, who had entered the S. of France from Italy, to raise the siege of Antibes and to retreat over the Var. In 1748 the king made him a duke and peer of France, and the department of war was committed to his charge. He reformed the army by abolishing many abuses, enlarged the military academy, and caused an order of merit to be established. The city of Metz is indebted to him for an academy. He died in 1761.

BELLENDEN, JOHN. See BALLENTYNE.

BELLENDEN, WILLIAM, a Scottish writer of the seventeenth century, distinguished for the elegance of his Latin style. He was educated at Paris, where he was professor of belles-lettres in 1602, and though he was made master of requests by James I., he still continued to reside in the French metropolis. In 1608 he published a work entitled Ciceronis Princeps, containing a selection from the works of Cicero, consisting of passages relating to the duties of a prince, &c. He afterwards republished this work, with some other treatises, under the title De Statu, libri tres. This work was published again, in 1787, by Dr. Samuel Parr, who added a celebrated Latin preface on the politics of that time. From another of Bellenden's works Conyers Middleton's Life of Cicero was almost entirely compiled without acknowledgment—a plagiarism denounced by Warton and Dr. Parr.

BELLEROPHON. See HIPPONOÜS.

BELLES-LETTRES, the French term for which the English equivalent is polite literature. It is impossible to give a satisfactory explanation of what is or has been called belles-lettres: in fact, the vaguest definition would be the best, as almost every branch of knowledge has at one time been included in, at another excluded from, this denomination. The most correct definition, therefore, would be, perhaps, such as embraced all knowledge and every science not merely abstract nor simply useful. In the division of the departments at the Lyceum of Arts, established at Paris in 1792, the belles-lettres comprehended general grammar, languages, rhetoric, geography, history, antiquities, and numismatics; whilst philosophy, mathematics, &c., were called, in contradistinction, sciences. If the name of belles-lettres ought to be retained at all, it would seem proper to include under it poetry, rhetoric, and all prose which has pretensions to elegance. A historical work, therefore, would fall within the definition of belles-lettres only if its style was distinguished for elegance. The same would be the case with books of travels, &c.

BELLEVAL, PIERRE RICHER DE, a celebrated botanist, born at Chalons-sur-Marne in 1558, deserves notice as the first in France who taught botany as a distinct science from medicine. Henry IV. having been made aware that French students were obliged to go into Italy to study botany, which had made great progress there since the establishment of botanical gardens at Padua, Pisa, and Bologna, determined to form a similar garden at Montpellier, and to create a new chair, the professor of which should teach anatomy in winter and botany in spring and summer. Belleval obtained the first appointment in 1593, and immediately began to make a collection of all the plants in Languedoc. About 400 quarto plates had been engraved, but he died in 1623, before the work could be published, and through the carelessness of his representatives, who sold the plates, almost the whole fruit of his labours was lost. The few which have been recovered are so excellent as to make the destruction of the others more deeply regretted.

BELLEVUE (Fr. *fine prospect*). This name is given to several villas and palaces, but particularly to a beautiful country palace in the neighbourhood of Paris, situated on the ridge of those hills which stretch from St. Cloud towards Meudon. It was built by Mad. de Pompadour. The building was commenced in July, 1748, and finished in Nov. 1750. After the death of Louis XV. the use of it was granted to the aunts of Louis XVI., mesdames de France. The first French artists of the time had exerted all their talents in embellishing Bellevue; so that this palace, at the period when it was built, was considered the most charming in all Europe. After the revolution the Convention decreed that Bellevue should be kept in repair at the expense of the nation, and that it should be devoted to public amusements. Nevertheless it was publicly sold during the highest pitch of revolutionary excitement, and the purchaser, M. Lenchere, a postmaster in Paris, had it demolished, quite in the spirit of the Bande Noire (which see). Its ruins are frequently visited on account of the beautiful view of Paris from this spot.

BELLEY (ancient *Bellica*), a town, France, department Ain, 39 miles S.E. of Bourg, and 38 miles S.W. of Geneva, agreeably situated between two hills, a short distance from the Rhone, in a fertile valley watered by the Furan. It is very ancient, having been a place of note in the time of Julius Cæsar, and is the seat of a bishopric, founded in 412. It contains a communal college, agricultural society, and court of primary resort. The episcopal palace, the belfry of the cathedral, the college, and the rich cabinet of medals and antiquities, are worth notice. Silkworms are reared; and lithographic stones, reckoned the best in France, are obtained from quarries in the neighbourhood. Pop. 4792.

BELLIARD, AUGUSTIN DANIEL, COUNT DE, lieutenant-general, peer of France, and sometime French minister in Brussels, distinguished as a general and diplomatist, was born in 1769 at Fontenay-le-Comte, in La Vendée, and entered the military service very early. Dumouriez soon after made him an officer of his staff. He fought at Jemappes, and was raised to the rank of lieutenant-general after the battle of Neerwinden. After Dumouriez had betrayed the Convention and fled, Belliard was carried as a prisoner to Paris, and dismissed from the service; but he soon entered the army again as a volunteer, and was again made lieutenant-general. Under Napoleon, serving in Egypt, Germany, Spain, and Russia, he rose to great military distinction. After the abdication of the emperor he received the order of St. Louis from Louis XVIII., and was made a peer and major-general of the French army. He again ranged himself on the side of Napoleon after his return from Elba, and received from him orders to hasten to King Joachim, in order to direct the operations of the Neapolitan army. The vessel which was to carry him to Naples was chased by a British ship, and obliged to return to France. The Bourbons, after their return, imprisoned him, and placed him under the surveillance of the police, but only for a short time, for, in 1816, he was again a peer, and subsequently fulfilled several important diplomatic missions. During his embassy in Brussels Belliard displayed uncommon activity: he contributed more than any other diplomatist to the foundation of the new Belgian government, and to the preservation of the city of Antwerp when the Dutch General Chassé threatened to lay it in ruins. He died Jan. 27, 1832.

BELLINI, JACOPO, and his two sons, GENTILE and GIOVANNI (who surpassed their father), celebrated painters, who made a new epoch in the Venetian school. Of Jacopo's works nothing has been left; but several of Gentile's (for example, a St. Mark) have reached our times. Gentile was born in 1421, and in 1479 went to Constantinople, Mohammed II. having sent to Venice for a skilful painter. He is said to have there copied the bass-reliefs of the column of Theodosius, and to have died at Venice in the year 1501. Giovanni, more distinguished than either his father or brother, was born at Venice about 1424, and died about 1516. He studied nature diligently, and his drawing was good. He contributed much to make oil-painting popular, and has left many excellent pictures, of which one, the Saviour Pronouncing his Benediction, is to be found in the gallery of Dresden. His own reputation was much increased by that of his celebrated disciples, namely, Titian and Giorgione. As their instructor he is sometimes called the founder of the Venetian school.

BELLINI, VINCENZO, a celebrated composer, born at Catania in Sicily in 1802, was educated at Naples under Zingarelli, commenced writing operas before he was twenty, and composed for the principal musical establishments in Europe. His most celebrated works are Norma, I Puritani, and La Sonnambula. He died of consumption near Paris in 1835. He is remarkable chiefly for sweetness of melody, suitableness of harmony, and an adaptation of sound to sense, and stood honourably distinguished from many of his profession by the excellence of his moral character.

BELLISLE. See BELLE-ISLE.

BELLMANN, KARL MICKEL, the most original among the Swedish poets, was born at Stockholm in 1740, and grew up in the quietude of domestic life. The first proofs which he gave of his poetical talents were religious and pious effusions. The dissipated life of young men at Stockholm devoted to pleasure was afterwards the subject of his poems. By these his name was spread over all Sweden. Even the attention of Gustavus III. was attracted to him, and he received from the king an appointment, which enabled him to devote himself almost entirely to poetical pursuits, in an easy independence, until his death in 1795. His songs are truly national, principally describing scenes of revelry.

BELL-METAL. See BELL.

BELLONA, the goddess of war, daughter of Phorcys and Ceto. She was called by the Greeks *Enyo*, and is often confounded with Minerva. She was anciently called *Duellona*, and was the sister of Mars, or, according to some, his daughter or his wife. She prepared his chariot when he was going to war, and drove his steeds through the tumult of the battle with a bloody scourge, her hair dishevelled, and a torch in her hand. The Romans paid great adoration to her; but she was held in the highest veneration by the Cappadocians, chiefly at Comana, where she had above 3000 priests. Her temple at Rome was near the Porta Carmentalis. In it the senators gave audience to foreign ambassadors and to generals returned from war. At the gate was a small column, called the *column of war*, against which they threw a spear whenever war was declared. The priests of this goddess consecrated themselves by making great incisions in their bodies, and particularly in the thigh, from which they received the blood in their hands to offer as a sacrifice to the goddess. In their wild enthusiasm they often predicted bloodshed and wars, the defeat of enemies, or the besieging of towns.

BELLOT, JOSEPH RENÉ, a French naval officer, whose personal merits and untimely fate render him an object of melancholy interest, was born at Paris in 1826, of a family in humble circumstances. At the age of sixteen entered the naval academy at Brest, where he continued for two years, and afterwards received a commission as *élève de marine* on board the *Berceau*. For his bravery in an expedition against Tamatave, Madagascar, he was promoted to the rank of an *élève* of the first class, and also created a chevalier of the Legion of Honour, though not yet twenty years old. On his return to France in 1847 he was made a sub-lieutenant, and the following year proceeded in the *Triomphante* to South America, where he remained for two years. Shortly after his return Lieutenant Bellot, who had been led to take a deep interest in the expeditions now being fitted out to the Arctic regions in search of Sir John Franklin, obtained permission from the French government to volunteer his services, which were readily accepted. In June, 1851, he embarked on board the *Royal Albert* schooner, fitted out by Lady Franklin, and commanded by Captain Kennedy. The voyage was ineffectual, but unattended with any disaster, and an interesting journal of it, kept by Bellot, was published after his death. In June, 1853, he sailed again on board the *Phœnix*, under the command of Captain Inglefield, on a new Arctic expedition, the principal object of which was to convey despatches to Sir Edward Belcher, then commanding H.M.S. *Assistance* in the Polar seas. The *Phœnix* reached safely Erebus and Terror Bay, where it found the *North Star*, whose commander, Captain Pullen, was absent on a journey of discovery. Captain Inglefield resolved to set out in search of him, but in his absence it became desirable to get the despatches conveyed to Sir Edward Belcher—a duty which Lieutenant Bellot undertook to perform by crossing the ice. Having set out with four sailors, a canoe, and a sledge, the party got separated in a gale of wind on the 18th of August, and Bellot, with two others, was drifted away on a piece of ice. With the view of ascertaining the direction the ice was taking, he crossed over to the opposite side of the hummock, and was never seen more. This was

all the information that could ever be learned of his fate. In testimony of the universal respect which his gallantry and personal worth had inspired, a subscription was afterwards entered into, by which a handsome granite obelisk was erected to his memory in front of Greenwich Hospital, and a provision made for his sisters.

BELLOWS, a machine for blowing fire, so formed as, by being dilated and contracted, to inhale air by a lateral orifice, which is opened and closed by a valve, and to propel it through a tube upon the fire. As soon as men began to make use of fire the importance of bellows was felt, since the natural bellows, if we may give this name to the lungs, could not be applied to any great extent. The invention of bellows is ascribed to Anacharsis the Scythian, though probably it took place in different countries. The forms of bellows at present are very various, as many attempts have been made for the improvement of this highly important machine, which becomes necessary wherever a powerful flame is required in the arts. As mining is carried on extensively in Germany, and great heat is required in smelting the ores and working the metals, many new kinds of bellows have been invented in that country, one of which consists of an empty box, which moves up and down in another, partially filled with water. Between the bottom of the empty box and surface of the water is a space filled with air, which is driven out by the descent of the inclosed box. Bellows of very great power are generally called *blowing-machines* (which see). One of the largest is the one in the smithy of the Royal Dockyard at Woolwich. It is adequate to the supply of air for forty forge-fires, amongst which are several for the forging of anchors, iron knees, and many other heavy pieces of smithery. The common Chinese bellows consist of a box of wood about 2 feet long and 1 foot square, in which a thick, square piece of board, which exactly fits the internal cavity of the box, is pushed backwards and forwards. In the bottom of the box, at each end, there is a small conical or plug valve to admit the air, and valves above to discharge it.

BELLOY, Pierre Laurent Buirette de, the first French dramatist who successfully introduced native heroes upon the French stage instead of those of Greece and Rome, or the great men of other nations, was born at St. Flour, in Auvergne, in 1727. He went to Paris when a child, lost his father soon after, and was supported by his uncle, a distinguished advocate in the Parliament of Paris, who designed him for the same profession. He applied himself to this profession with reluctance, while he showed much genius for the drama. His uncle opposed this taste, and the young man secretly left his house. He now made his appearance at several northern courts as an actor, under the name of *Dormont de Belloy*. Belloy had hoped to reconcile his family to him by the success of his first tragedy Titus, but this hope was disappointed by the failure of the piece; and the author went to St. Petersburg. Shortly after his uncle died, and Belloy returned again to France, where he brought out his tragedy Zelmire, which was acted with the most complete success. In 1765 followed his Siége de Calais, a tragedy which produced a great sensation, and is still esteemed, though it owes the applause bestowed on it rather to its subject than to its poetical merit. He received the medal promised by the king to those poets who should produce three successful pieces, and which has been awarded only on this occasion. On account of the great applause with which the Siege of Calais was received, it was counted as two, it being, in fact, only the second successful piece of Belloy. The city of Calais sent him the freedom of the city in a gold box, with the inscription *Lauream tulit, civicam recipit.* Belloy has written sundry other dramatic pieces, of which Gaston et Bayard procured his reception into the Académie Française. Upon the whole he was not happy in the expression of tragical pathos. He died in 1775.

BELL ROCK, or Inch Cape, a dangerous rock of Scotland, situated in the German Ocean, about 12 miles from Arbroath, nearly opposite the mouth of the river Tay; lon. 2° 22′ W.; lat. 56° 29′ N. It is said that in former ages the monks of Aberbrothock caused a bell to be suspended on this rock, which was rung by the waves, and warned the mariners of this highly dangerous place. Tradition also says that the bell was wantonly cut away by a pirate, and that afterwards his vessel in a stormy night drifted on the rock, and as a retribution for his crime he perished with all his crew. It was not till after the beginning of the present century that the Bell Rock was distinguished by any light to scare the mariner from its fatal vicinage. At length a bill was brought into Parliament, 1803, by the Commissioners of the Northern Lighthouses for the purpose of having a lighthouse stationed on the rock. On the bill being passed in 1806 they received a loan of £25,000 from government to assist an accumulated fund of £20,000. Plans were laid before them of different kinds, and they adopted that of Mr. Rennie, which was on the principles of the Eddystone Lighthouse. Operations were commenced in the summer of 1807, and after overcoming almost insurmountable difficulties the building was completed in October, 1810. In the course of the winter the internal fittings went forward, and on the 1st of February, 1811, the beacon was first lighted. The expense of the whole was about £60,000. The construction of the building took place under the direction of Mr. Robert Stevenson, civil engineer, Edinburgh, who in 1824 published an account of it in a quarto volume.

The Bell-Rock Lighthouse is a circular edifice, the foundation-stone of which is nearly on a level with the surface of the sea at low water of ordinary spring-tides, and at high water of these tides the building is immersed to the height of about 15 feet. The ground-course measures 42 feet in diameter, and the building diminishes to a thickness of 13 feet. The total height is 100 feet, but including the light-room the total height is 115 feet. The building is solid to a height of 30 feet, where the entry-door is situate, to which the ascent is by a ladder with wooden steps. Strangers are carried up and down by a chair and crane. At first the walls are 7 feet thick, and they diminish to a single foot. From the door-way to the top there are six flats, each having an apartment, and a communication from one to the other is had by a wooden ladder. The first floor is for holding water, fuel, or other bulky articles; the second for oil-cisterns, glass, and other light-room stores; the third is occupied as a kitchen; the fourth is the bed-room; the fifth the library or strangers' room; and the upper apartment forms the light-room. The floors are of stone. The light-room is covered with a dome roof of copper, terminating in a gilded ball. Round the light-room there is a railed terrace on the outside. The light is from oil, with argand-burners placed in the focus of silver-plated reflectors, measuring 24 inches over the lips, being hollowed to the parabolic curve. That the light may be distinguished from all others on the coast, the reflectors are ranged upon a frame with four faces or sides, which by a train of machinery is made to revolve upon a perpendicular axis once in six minutes; moreover, by the interposition of coloured glass between the light and the observer in the course of every revolution two appearances are produced: one is the common bright light,

and the other is of a red colour. As a further warning to the mariner in foggy weather, two large bells are tolled day and night by the same train of machinery which moves the lights.

The Bell-Rock Lighthouse is now one of the most prominent and serviceable beacons on the Scottish shores, and has been the means of preventing innumerable wrecks. In summer it is occasionally visited by parties of pleasure from Leith and other places, when every attention is shown by the keepers. Though perched in a situation the most awful during commotions of the elements, these men feel no alarm for their safety. In cases of very heavy gales blowing from particular directions, they mention that they feel the fabric yield or tremble a little; but nothing to excite any disquietude. In fine weather at low tides they can walk out upon the reef and indulge in the amusement of fishing for cod, haddocks, and all the other kinds of white fish of these seas, of which there is here great abundance. They keep an album, in which the names and *impromptus* of visitors are inscribed. On one occasion Sir Walter Scott honoured this Pharos of the Scottish seas with a visit, and left the following beautiful lines:—

PHAROS LOQUITUR.

'Far on the bosom of the deep,
O'er those wild shelves my watch I keep;
A ruddy gem of changeful light,
Bound on the dusky brow of night:
The seaman bids my lustre hail,
And scorns to strike his tim'rous sail.'

BELOOCHISTAN, an extensive country in the S. of Asia, lying between Persia and the valley of the Indus, having the former on the W., Afghanistan on the N., Scinde on the E., and the Arabian Sea on the S., extending from lat. 24° 50′ to 30° 40′ N.; and from lon. 58° 51′ to 67° 30′ E.; area, 160,000 square miles. It comprises the seven provinces Cutch Gundava, Sarawan, Kelat, Jhalawan, Lus, Mekran or Mukran, and Kohistan. The general surface of Beloochistan is rugged and mountainous, with some extensive intervals of barren sandy deserts. The directions of the numerous mountain-chains with which it is intersected are almost wholly unknown, except in the case of a few of the principal ranges, and of these the general parallelism and uniformity are somewhat remarkable, one system having an inclination from N. to S., another from E. to W. Many of these mountains are of great height, and covered with snow. The geology of Beloochistan, like all its other physical features, is but imperfectly known. Some of the mountain-chains are of compact limestone, inclosing marine shells and corals, identical with similar objects picked up on the sea-shores at this day. The Kohistan or hill country of the N.W. bears strong marks of existing volcanic action. Excepting fragments of quartz found in Lus, primary formations have not been observed in any part of the Beloochee mountains. In the same province is a singular geyser of liquid mud, resembling the Malacuba or mud-volcano of Sicily. The mineral wealth of the country is believed to be considerable, including gold, silver, lead, iron, copper, many kinds of mineral salts, and saltpetre. Rock-salt is common in Kohistan. Throughout Beloochistan there is a great deficiency of water, particularly in summer. In the N. part are the rivers Bolan and Molloh, the courses of which form the celebrated passes bearing their names, leading from the valley of the Indus to Beloochistan and Afghanistan. The soil is not in general fertile, but patient industry has rendered the plains and valleys productive in wheat, barley, and millet. The other chief crops are madder, cotton, particularly in Cutch Gundava, rice, indigo, and tobacco. Vegetables are abundant, and excellent fruits are produced in the gardens and orchards in the neighbourhood of the towns.

The inhabitants are divided into two great branches, the Beloochees and Brahooees, different in their language, figure, and manners, and each subdivided into a number of minor tribes. The Brahooees have greater physical strength than the Beloochees, and are less addicted to predatory violence. Both races are hospitable, brave, and capable of enduring much fatigue. They live in rude tents made of black felt or coarse cloth, of goat's or camel's hair, stretched over a frame of wicker-work. Both Beloochees and Brahooees are of the Sunnite sect of Mohammedans, and opposed to the Shiites. The Beloochee language resembles the modern Persian, the Brahooee the Hindoo. The manufactures of Beloochistan are confined to a few matchlocks and other firearms at Kelat, and the trade is unimportant. The government is despotic, the khan having unlimited power over life, person, and property. He usually resides at Kelat, and his rule is almost confined to the immediate province around it. His revenues are estimated at upwards of £30,000.

About the middle of last century Beloochistan was made tributary by Nadir Shah, who bestowed it on Nasir Khan, with the title of beglerbeg, or commander-in-chief, who proved himself the ablest ruler that ever governed the country. On his death in 1795 he left the country in a comparatively prosperous condition, but it has since suffered greatly from intestine wars, and its boundaries have been curtailed. During the Afghan war in 1839 the conduct of Mehrab Khan, the ruler of Beloochistan, was marked with so much hostility to the British, that a British force was detached to assault Kelat, which was taken by storm after a siege of a few hours, Nov. 13 the same year. It was again occupied by the British in 1840, but in the following year Mir Nasir Khan, the son of Mehrab Khan, was recognized as ruler, and the British soon left the country. The chief town is Kelat. The population of the whole country is uncertain, being variously estimated at from 450,000 to 2,000,000.

BELPER, a market town, England, county of Derby, in a valley, on the left bank of the Derwent, over which there is a handsome stone bridge of three arches, 7 miles N. of Derby, on the Midland Railway. The older houses of the town are fast disappearing, and are being replaced by handsomer and more commodious buildings; while numerous neat little villas, with flower-gardens, orchards, &c., attached, are fast rising on the elevated grounds around the town. It has three churches, various Dissenting chapels, National and other schools, and a mechanics' institute. Belper owes its prosperity to its cotton, and silk and cotton hosiery manufactures, which are very extensive. Nails and earthenware are also manufactured here to a great extent. Pop. 9509.

BELSHAM, THOMAS, a Unitarian minister, born in 1750, became theological tutor of an academy at Daventry in 1781. At this time he was a Calvinist, but a change of views unfitted him for this situation, and he became tutor of an academy which had been recently established at Hackney. This institution soon sunk for want of funds, and Belsham removed first to the Gravel Pit Chapel, which had been occupied by Dr. Priestley, and afterwards to Essex Street Chapel, where he officiated for some time as the colleague of Mr. Lindsey, and latterly as sole pastor till his death in 1829. His works are chiefly of a controversial nature, and probably attracted attention as much from the celebrity of the works which they attacked as from their own merits. His first appearance in the polemical

field was as an opponent of Mr. Wilberforce, of whose celebrated Practical View of the Prevailing Religious Systems he published a review. He also published Memoirs of Mr. Lindsey, which was reviewed by the celebrated Robert Hall.

BELSHAM, WILLIAM, a miscellaneous writer of some eminence, who died in 1827, aged seventy-five. He published in 1789 Historical, Political, and Literary Essays (two vols. 8vo); and he subsequently wrote on the test law, the French revolution, parliamentary reform, and other subjects; but his principal work is a History of Great Britain, from the Revolution to the Treaty of Amiens (1793–1806, twelve vols. 8vo).

BELSHAZZAR, the last of the Chaldean dynasty who reigned at Babylon. He is supposed to have been the son of the Nabonnedus of Berosus, Labynetus of Herodotus, and Naboandelus of Josephus, and to have been adopted by his father as joint king some time before the fall of Babylon. He perished B.C. 538, during the successful storming of Babylon by Cyrus. The interesting circumstances which immediately preceded this event, and are recorded at length in the book of Daniel, have repeatedly furnished subjects to painters and poets.

BELT, THE GREAT and LITTLE, two straits of Denmark, connecting the Baltic with the Cattegat. The former runs between the islands of Zealand and Funen, and is about 15 miles in width, where it is crossed from Nyborg, in Funen, to Corsoer, in Zealand. The greatest breadth of the strait is 20 miles. The navigation is very dangerous, on account of the many small islands and sand-banks by which the channel is impeded. The Little Belt is between the island of Funen and the coast of Jutland, and the narrowest part of the strait is not more than a mile in width. At this place stands the fortress Fredericia, where the tolls were paid. The fortress commands completely the entrance from the Cattegat. The Sound, between Zealand and the Swedish coast, is preferred for all large vessels entering or leaving the Baltic.

BELTEIN, or BELTANE, a kind of festival formerly observed on the 1st of May by the Celtic population of Ireland and Scotland, and indeed common at one time to all Celtic nations. We have accounts of its being celebrated even as lately as the beginning of the present century. The chief ceremony connected with the Beltein consisted in lighting fires on the hill-tops, in which sacrifices, in very remote times probably human sacrifices, were offered. According to Dr. Keating, the animals were not sacrificed in the flames, but merely driven through them, which was considered to secure them against contagious diseases during the year; but although this may have been the practice in later times, it seems more likely that the animals were originally actually sacrificed. When the Beltein fires were lighted it was compulsory upon all first to have their fires extinguished, and in early times this seems to have been enforced with great rigour. The domestic fires were afterwards rekindled from the embers of the Beltein fire. The meaning of the word Beltein is fire of Beal, who was the Celtic god of light. Hence the 1st of May was chosen for his festival, May being the month in which the sun, the great source of light, begins to recover his lost splendour. From the similarity of the name and attributes of the Celtic god Beal to the Phœnician Baal, and the Assyrian Bel, many have identified the Celtic god with the other two; but although it is quite possible that the names have a common origin, there is no reason to suppose that the worship of Beal, and the observances connected with it, were derived from those of the Phœnician Baal.

BELVEDERE (Ital. *fine sight*. See BELLEVUE). The name of buildings in Italy destined for the enjoyment of prospects. The name is also given to the small cupolas on houses which are ascended for the sake of fresh air, or of the view which they afford. Many of the buildings in Rome are furnished with such cupolas; yet the term *belvedere* is generally applied only to those on the palaces of the rich. This is the name also of a part of the Vatican where the famous statue of Apollo is placed, which, on this account, is called Apollo Belvedere.

BELZONI, GIOVANNI BATTISTA (John Baptist), an enterprising traveller, was born at Padua in 1778, and educated at Rome. He was destined for the monastic life, but left the city when it was occupied by the French armies, and in 1803 went to England, where he acted the parts of Apollo and Hercules at Astley's Amphitheatre. Here he acquired, besides an acquaintance with the English language, much knowledge of the science of hydraulics, the study of which had been his chief occupation in Rome, and which afterwards carried him to Egypt. He left England, after a residence of nine years, accompanied by his wife (who faced the Arabs with the courage of an Amazon), and took his way through Portugal, Spain, and Malta, to Egypt. There he lived from 1815 to 1819, at first as a dancer, till he won the favour of the pasha, who made use of his services. Belzoni, though often alone amidst the rude inhabitants of the country, kept them in awe by his extraordinary stature and strength. He succeeded in opening the second of the pyramids of Ghizeh, known by the name of Cephrenes. In the year 1816 his perseverance and skill succeeded in transporting the bust of Memnon from Thebes to Alexandria, from whence it came to the British Museum. In 1817 he entered several catacombs near Thebes, especially one in a fine state of preservation in the valley of Biban el Molook, which is considered to be the mausoleum of Psammetichus, and from which he took the splendid alabaster sarcophagus which is now contained in the British Museum. On the 1st of August in the same year he opened the temple of Ipsambul, near the second cataract of the Nile, which two Frenchmen, Cailliaud and Drovetti (the French consul-general), had discovered the year before, but had not succeeded in opening. Belzoni discovered a subterraneous temple in its ruins, which until that time had been unknown. He then visited the coasts of the Red Sea and the city of Berenice, and made an expedition into the Oasis of Jupiter Ammon. His journey to Berenice was rewarded by the discovery of the emerald mines of Zubara. Belzoni refuted Cailliaud's assertion, that he had found the famous Berenice, the great emporium of Europe and India, by subsequent investigations on the spot, and by the actual discovery of the ruins of that great city four days' journey from the place which Cailliaud had taken for Berenice. Belzoni's Narrative of the Operations and Recent Discoveries within the Pyramids, Temples, Tombs, and Excavations in Egypt and Nubia; and of a Journey to the Coast of the Red Sea in Search of Berenice; also of another to the Oasis of Jupiter Ammon (London, 1820); accompanied by a folio vol. of forty-four copper-plates, was received with general approbation. Padua, his native city, requited his present of two Egyptian statues from Thebes, with a medal by Manfredini. In the year 1823 this enterprising traveller had made preparations for passing from Benin to Houssa and Timbuctoo, when he died at Gato, on his way to Benin, Dec. 3, 1823. He believed the Nile and Niger to be different streams, and that the Niger empties its waters into the Atlantic Ocean; opinions which have long been proved to be correct.

BEM, JOSEPH, a distinguished military commander, noted for the share taken by him in support of the patriotic cause in Hungary, was a native of Poland, and born at Tarnow, in Galicia, in 1795. He was educated at the University of Cracow, and distinguished himself greatly in mathematical science. In 1810 he was admitted into the corps of cadets founded at Warsaw by Napoleon, afterwards entered the horse artillery, and took part as lieutenant in the expedition of the French army to Russia. For the bravery here displayed by him he received the decoration of the cross of the Legion of Honour. From the conclusion of the war in 1815 till 1831 he lived partly in Poland and partly in Galicia, and it was here that he heard of the outbreak of the Polish revolution. He at once hurried to Warsaw, was made major of a troop of horse artillery, and after the battle of Iganie promoted to the rank of lieutenant-colonel. During the whole of the Polish struggle he displayed great gallantry and military skill, and on the night of 7th September, 1831, held the bridge of Praga with his artillery, but the following morning, on hearing of the agreement concluded with the Russians, withdrew to Modlin. After the fall of Warsaw he crossed the frontier to Prussia, and in 1832 proceeded to Paris, where for the next sixteen years he continued to reside, occupying himself partly with political schemes, partly with scientific pursuits, and also making journeys into Spain, Portugal, Holland, and Belgium.

Upon the commencement of the Austrian insurrection in 1848, General Bem proceeded there, and having volunteered his services to the revolutionary party, took a prominent part in conducting the defence of Vienna against the imperial troops. Immediately before the surrender of the capital he disappeared from the scene of action, and re-appeared in the beginning of November at Presburg. Towards the end of the year he received a commission from the new Hungarian government to undertake the conquest of Transylvania, and crossed over into that territory at the head of a large army, raised by his own exertions in an incredibly short space of time. His progress here was marked by great successes, with occasional checks; and in March, 1849, he succeeded in driving the Austrians, with their Russian auxiliaries, through the Rothenthurm Pass into Wallachia. He subsequently made an incursion into the Banat, which he compelled Puchner to evacuate. He then returned to Transylvania, but found himself unable to cope with the overwhelming numbers of the opposing forces, and after several reverses, returned to Hungary, where he took part in the disastrous battle of Temesvar. He now returned to Transylvania, but being unable to maintain himself there retreated across the frontier to Turkey, declared himself a convert to Mohammedanism, and received an appointment in the sultan's army under the name of Amurath Pasha. In Feb. 1850 he was directed, along with other Hungarian exiles, to take up his abode at Aleppo, where a fever carried him off on 10th December of same year.

BEMBO, PIETRO, one of the most celebrated of the Italian scholars that adorned the sixteenth century, was born at Venice in 1470. He very early learned the Latin, and afterwards, at Messina, under the direction of Lascaris, the Greek language. At Ferrara he completed his philosophical studies, and thence he returned to Venice, where a literary society had been established in the house of the printer Aldus Manutius. Bembo became one of its principal members, and for some time took pleasure in correcting the beautiful editions which proceeded from this celebrated press. After visiting Rome he went in 1506 to the court of Urbino, at that time one of those Italian courts where the sciences stood highest in esteem. He lived there about six years, and gained several powerful friends. In 1512 he went to Rome with Giulio de' Medici, whose brother, Pope Leo X., made him his secretary, and gave him his friend Sadoleto for a colleague. About this time Bembo became acquainted with the young and beautiful Morosina, with whom he lived in the most tender union during twenty-two years. She presented him with two sons and a daughter, whom he educated with the greatest care. His many labours arising from his office, as well as his literary pursuits, and perhaps too great an indulgence in pleasure, having impaired his health, he was using the baths of Padua when he was apprised of the death of Leo X. Being by this time possessed of several church benefices, he resolved on withdrawing entirely from business, and on passing his days at Padua (the air of which he had found very beneficial), occupied only with literature and science, and enjoying the society of his friends. Bembo collected a considerable library: he had a cabinet of medals and antiquities, which at that time passed for one of the richest in Italy, and a fine botanical garden. In the year 1529, after the death of Andreas Navagero, the office of historiographer of the republic of Venice was offered to him, which he accepted after some hesitation, declining the salary connected with it. At the same time he was nominated librarian of the library of St. Mark. Pope Paul III., having resolved upon a new promotion of cardinals, from the most distinguished men of his time, conferred on him, in 1539, the hat of a cardinal. From that time Bembo renounced the belles-lettres, and made the fathers and the Holy Scriptures his chief study. Of his former labours he continued only the History of Venice. Two years later Paul III. bestowed the bishopric of Gubbio on him, and soon after the rich bishopric of Bergamo. He died, loaded with honours, 1547, in the seventy-seventh year of his age.

A collection of all his works, which were frequently printed singly, appeared in 1729, at Venice, in four folio vols. The most important of them are: History of Venice from 1487 to 1513, in twelve books, which he wrote both in Latin and Italian; Le Prose, dialogues in which the rules of the Italian language are laid down; Gli Asolani, dialogues on the nature of love; Le Rime, a collection of beautiful sonnets and canzonets; his letters both in Latin and Italian; Carmina, which are ingenious and elegant, but more free than the author's profession would lead us to expect; besides several others.

BEN (Hebrew, *son*), a prepositive syllable found in many Jewish names, as *Bendavid*, *Benasser*, &c., which, with the Jews in Germany, has been changed into the German *Sohn* (son), for example, *Mendelssohn*, *Jacobssohn*, &c. The origin of this manner of naming is to be found in the ancient custom of the Israelites having no family names, which is still their usage in many countries.

BENARES, one of the North-western Provinces of India, and a town in the same. The area of the district is 19,800 square miles, 16,000 of which are rich cultivated flats on each side of the Ganges. The heat in summer is excessive, but in winter fires are requisite. Garden stuffs, grain of different kinds, flax for oil (no linens are manufactured here), and sugar, are the principal objects of cultivation. Rice, for which many parts of the soil seem well adapted, is seldom grown. Muslins, silks, and gauzes, salt, indigo, and opium, are made very extensively. The principal towns are Benares, Mirza-pur, Chunargarh, and Ghazi-pur. The pop. is about 9,450,000, and the Hindoos are to the Mussulmans as ten to one in the town, and as twenty to one in the villages.

The town (in Sanscrit, *Varanasi*, from the two streams Vari and Nasi) stands in lat. 25° 30′ N., and lon. 83° 1′ E., on the high bank and northern side of the Ganges, from which it rises like an amphitheatre. The height of the houses and narrowness of the streets give it all the usual inconveniences of an Asiatic town. The pop. is estimated at 200,000, of whom not less than 20,000 are said to be Brahmins; and at the great Hindoo festivals the concourse is immense; for *Kasi*, or *Kashi, the Splendid*, as the Indians commonly call it, is one of the most sacred places of pilgrimage in all India. To die at Benares is the greatest happiness for a Hindoo, because he is then sure of immediate admission into heaven. The number of pious foundations and temples is exceedingly great. Several of the Hindoo princes have agents here to offer up sacrifices in their behalf. The principal temple is called *Visweswar* or *Biscar*, and is dedicated to Siva, whose sacred relic it contains. Aurungzebe built a splendid mosque on the highest ground in the city, and on the ruins of a temple. At the end of the seventeenth century an observatory was erected in this city, which still exists; and a college for the instruction of Hindoos in their own literature was established by the British government in 1801; but it has not yet done much for the revival of learning among the natives, owing to the pride of the Brahmins. Benares has long been the great mart for diamonds and other gems, brought principally from the Bundelcund. The merchants and bankers are numerous and wealthy. There are few English inhabitants, except the government officers and the members of the circuit court. Kasi was ceded to the East India company by the Nabob of Aud'h (Oude) in 1775, and since 1781 has enjoyed uninterrupted tranquillity. The inhabitants are better informed than the natives of the country in general. The reader will find an interesting account of Benares in Bishop Heber's Narrative of a Journey through the Upper Provinces of India in 1824–26 (London, 1828).

BENBOW, JOHN, an English naval character of distinguished merit, was born in Shrewsbury about 1650, and brought up to the sea in the merchant service. He fought so desperately against a pirate from Sallee, in one of his trips to the Mediterranean, about the year 1686, as to beat her off, though greatly his superior in men and metal. For this gallant action he was promoted at once by James II. to the command of a ship of war. William III. employed him in protecting the English trade in the Channel, which he did with great effect. His valour and activity secured him the confidence of the nation, and he was soon promoted to the rank of rear-admiral, and charged with the blockade of Dunkirk. But the squadron in that port, under the command of Du Bart, managed to slip out of port; nor could Benbow, though he sailed instantly in pursuit, overtake it. In 1701 he sailed to the West Indies with a small fleet, having accepted a command previously declined by several of his seniors, from the supposed superiority of the enemy's force in that quarter. In August of the following year he fell in with the French fleet under Du Casse, and for five days maintained a running fight with them, when he at length succeeded in bringing the enemy's sternmost ship to close-quarters. In the heat of the action a chain-shot carried away one of his legs, and he was taken below; but the moment the dressing had been applied to the wound he caused himself to be brought again on deck, and continued the action. At this critical instant, being most disgracefully abandoned by several of the captains under his command, who signed a paper expressing their opinion that "nothing more was to be done," the whole fleet effected its escape. Benbow, on his return to Jamaica, brought the delinquents to a court-martial, by which two of them were convicted of cowardice and disobedience of orders, and condemned to be shot; which sentence, on their arrival in England, was carried into execution at Plymouth. Benbow, who suffered equally in mind and body from this disgraceful business, gradually sank under his feelings, and expired at Jamaica, Nov. 4, 1702.

BENCOOLEN (Dutch, *Benkoelen*), a seaport of Sumatra, on the S.W. coast; lon. 102° 19′ E.; lat. 3° 47′ 36″ S. The English settled here in 1685, and in 1690 the East India Company built a fort here, calling it Fort York. In 1825 Bencoolen was yielded up to the Dutch in exchange for the settlements on the Malay Peninsula. A convenient river on its N.W. side brings the pepper out of the inland country; but there is great inconvenience in shipping it, by reason of a dangerous bar at the river's mouth. The place, which is almost two miles in compass, is known at sea by a high, slender mountain, which rises in the country, 20 miles beyond it, called the Sugar Loaf. It is inhabited by a mixed population. The medium heat throughout the year is from 81° to 82°. Pepper is the only produce of the adjacent country, which is mountainous and woody. The air is full of malignant vapours, and the mountains always covered with thick clouds, which burst in storms of thunder, rain, &c. Pop. 6000.

BENDA, GEORGE, director of the chapel at Gotha, born at Jungbuntzlau, in Bohemia, 1721, received from Frederick II. the place of the second violinist in the chapel of Berlin, but in 1748 entered the service of the Duke of Gotha as chapel-master, where he constantly cultivated his talents for composition, particularly of sacred music. His Ariadne, an opera, was received with enthusiastic applause in Germany, and afterwards in all Europe, being distinguished for originality, sweetness, and ingenious execution. His compositions are numerous; but his Ariadne is his best work. He died in the neighbourhood of Gotha, 1795. His absence of mind has given rise to many amusing anecdotes. His elder brother Francis was a distinguished violinist. Their father was a poor linen-weaver.

BENDER (in the Moldau language, *Tigino*), the chief city of a district in the Russian province Bessarabia, on the Dniester; lon. 24° 46′ E.; lat. 46° 51′ N.; pop. 24,443. It is built in the shape of a crescent, is well fortified, has twelve mosques and one Armenian church. The streets are narrow and dark. Its commerce is important, and it carries on some branches of manufacture. Charles XII. resided here from 1709 to 1712. In 1771 the Russians took the place, and killed most of the troops and citizens, amounting to nearly 30,000 persons. The peace of Kainardji, in 1774, restored it to Turkey. In 1809 it was conquered by the Russians, but again restored to the Turks by the peace of Jassy. Since the peace of Bucharest, in 1812, it has belonged to Russia.

BENE, a town, Italy, Piedmont, province of Cuneo, 11 miles N. of Mondovi, between the Sture and the Tanaro. It has a college, an old castle, and an hospital. This town has arisen out of the ruins of the ancient *Augusta Bagiennorum*, destroyed by Alaric, and of which many interesting vestiges are found at Roveglia, about half a mile distant. The ruins of an aqueduct, amphitheatre, baths, and other buildings, extend over a considerable tract of ground. Pop. 2159.

BENEDICT, the name of no fewer than fourteen popes, commencing with the first of the name who was elected to the papal chair on the death of John III. in 574. The first deserving of notice is Benedict IX., who succeeded John XIX. in 1033.

He was a mere boy at the time of his election, and obtained it through family interest and bribery. His licentiousness plunged Rome into a state of anarchy, and he was ignominiously expelled by the citizens, who elected a successor known by the name of Sylvester III. Six months after Benedict returned, regained the ascendency, and excommunicated Sylvester; but finding the general detestation too strong to permit him to resume his chair, sold it to John Gratianus, who assumed the title of Gregory VI. There was thus a trio of popes, and the emperor, Henry III., to put an end to the scandal thus occasioned, assembled a council at Sutri, which got quit of the difficulty by deposing all the three. The ultimate fate of Benedict is not well known, but he is believed to have died in a convent. The next Benedict deserving of notice was the thirteenth of the name, originally Cardinal Orsini, and Archbishop of Benevento, who became pope in 1724. His private character appears to have been unexceptionable, but he bestowed his confidence on Cardinal Coscia, who was unworthy of it, and abused it in gratifying his avarice. Before he obtained the popedom he must have been at least a laborious writer; for his works, including sermons, fill three vols. folio. He died in 1730, and was succeeded by Clement XII.

BENEDICT XIV., Prospero Lambertini, born at Bologna in 1675, of a very respectable family, distinguished himself in his youth by a rapid progress in all the sciences. His favourite author was St. Thomas. He applied himself with success to the canon and civil law, and became advocate to the consistory at Rome. Afterwards he was appointed *promotor fidei*, and wrote a valuable work on the Ceremonies used in Beatifications (Bologna, 1734, four vols. folio). He was passionately fond of learning, of historical researches, and monuments of art, and also associated with the distinguished men of his time; among others with Father Montfaucon, who said of him, 'Benedict has two souls; one for science, and the other for society.' He also made himself familiar with the best poetical works, whereby his mind became elevated and his style animated. Benedict XIII. made him, in 1727, bishop of Ancona; in 1728 cardinal, and in 1732 archbishop of Bologna. In every station he displayed great talents, and fulfilled his duties with the most conscientious zeal. He opposed fanaticism even at the risk of his own safety, defended the oppressed, and expressed himself with the greatest frankness to Clement XII. without losing his favour. When, after the death of Clement XII. in 1740, the election of a new pope in the conclave was retarded by the intrigues of Cardinal Tencin, and the cardinals could not agree, Lambertini, with his usual good nature, said to them, 'If you want a saint, take Gotti; if a politician, Aldobrandi; if a good old man, myself.' These words, thrown out in a humorous manner, operated on the conclave like inspiration, and Lambertini, under the name of Benedict XIV., ascended the papal throne. His choice of the ministers and friends whom he assembled around him does the greatest honour to his judgment. The condition of the church and of the Roman court had not escaped his penetration. Since the Reformation princes no longer trembled at the thunders of the Vatican. The popes had renounced their pretensions to worldly authority, and Lambertini knew that respect for the papal authority could be maintained only by a wise moderation. He constantly regulated his measures this principle, and thus succeeded, even in difficult circumstances, in satisfying not only the Catholic but even the Protestant princes. The sciences were a special object of his care. He established academies at Rome; promoted the prosperity of the academy at Bologna; caused a degree of the meridian to be measured; the obelisk to be erected in the Campus Martius; the church of St. Marcellino to be built after a plan projected by himself; the beautiful pictures in St. Peter's to be executed in mosaic; the best English and French works to be translated into Italian; and commanded a catalogue of the manuscripts contained in the Vatican library (the number of which he had enlarged to 3300) to be printed. His government of the Papal States did equal honour to his wisdom. He enacted severe laws against usury, favoured commercial liberty, and diminished the number of holidays. His piety was sincere, yet enlightened and forbearing. He strove to maintain purity of doctrine and of morals, giving in his own character the most praiseworthy example. He died after a painful sickness, during which his cheerfulness and vivacity never deserted him, May 3, 1758. The sole reproach brought against him by the Romans was that he wrote too much and governed too little. His works compose, in the Venice edition, sixteen vols. folio. The most important of his works is that on the Synods, in which we recognize the great canonist.

BENEDICT, St., the founder of the first religious order in the West; born at Norcia, in Spoleto, in the province of Umbria, in Italy, A.D. 480. In the fourteenth year of his age he retired to a cavern situated in the desert of Subiaco, 40 miles from Rome, and in 515 drew up a rule for his monks, which was first introduced into the monastery on Monte Cassino, in the neighbourhood of Naples, founded by him (529) in a grove of Apollo after the temple had been demolished. This gradually became the rule of all the western monks. The abbots of Monte Cassino afterwards acquired episcopal jurisdiction, and a certain patriarchal authority over the whole order. Benedict, with the intention of banishing idleness, prescribed, in addition to the work of God (as he called prayer and the reading of religious writings), the instruction of youth in reading, writing, and ciphering, in the doctrines of Christianity, in manual labours (including mechanic arts of every kind), and in the management of the monastery. With regard to dress and food, the rule was severe but not extravagant. Benedict caused a library to be founded, for which the aged and infirm brethren (*ordo scriptorius*) were obliged to copy manuscripts. By this means he contributed to preserve the literary remains of antiquity from ruin; for though he had in view only the copying of religious writings, yet the practice was afterwards extended to classical works of every kind; and the learned world is indebted for the preservation of great literary treasures to the order of St. Benedict. See Benedictines.

BENEDICTBEUERN, formerly an abbey situated in the Bavarian circle of the Iser, about 40 miles distant from the city of Munich, on the descent of the mountains towards the Tyrol. The convent was founded as early as 740. In our days it is only remarkable for the manufactory of optical instruments belonging to Reichenbach and Liebherr, who have furnished instruments to almost all the observatories of Europe.

BENEDICT BISCOP, an Anglo-Saxon monk of the seventh century, born of a noble Northumbrian family in 628 or 629. He spent the first years of his life at court, but at the age of twenty-five he relinquished this manner of life and accompanied Wilfrid on a pilgrimage to Rome in 653. Here he lived for more than ten years, when he returned to England; but not very long after he again went to Rome, this time on a mission intrusted to him by Alchfrid, king of Northumbria. On his way back he stopped at Lerins in Provence, where he remained

for the next two years, making himself acquainted with the rules of monastic life in the monastery of Lerins, of which he had become a member. In 668 he left Lerins and made a third journey to Rome, where he arrived just at the time when the pope was about to appoint some one to fill the see of Canterbury, which was then vacant. Having fixed upon Theodore, a Cilician monk, he requested Benedict to accompany him to England to assist him in securing the favour of the Anglo-Saxons, which as a foreigner he might have difficulty in doing. Benedict agreed to do this, and was presented with the abbacy of St. Peter's in Canterbury; but at the end of two years he resigned the abbacy and again went to Rome. On this occasion he returned to England with a valuable collection of books and a large number of relics, which he had accumulated during his previous visits to Rome. With these he proceeded first to Wessex with the intention of remaining there, but finding that the King of Wessex was dead he turned northwards to his native Northumbria, and there he was fortunate enough to secure the favour of King Egfrid. From him he received a donation of land at the mouth of the Wear, on which he founded the monastery of Wearmouth. In 678 he made yet another (his fourth) journey to Rome, and brought back additional stores of books for his library, as well as pictures, images, glass for windows, &c., with which he decorated the monastery he had founded. He was now presented by Egfrid with a further grant of land on the other side of the Wear, where he founded another monastery, that of Jarrow, dependent on the monastery of Wearmouth. During the remainder of his life he continued to live in the latter monastery, except on the occasion of a fifth voyage to Rome which he made in 685, and from which he derived as before valuable additions to his various collections. It is chiefly by these collections that his services to learning are to be estimated, and there can be no doubt that his great pupil the 'Venerable Bede,' who was a monk in the monastery of Jarrow, was immensely indebted to them for the learning he acquired. Benedict died in the monastery of Wearmouth, Jan. 12, 690. His life was written by Bede.

BENEDICTINES. From the sixth to the tenth century almost all the monks in the West might be so called, because they followed the rule of St. Benedict of Norcia. (See BENEDICT (ST.), MONASTERY, and ORDER.) The rules which at that time the monasteries in Spain and France received from their bishops, as well as the rule of the Irish St. Columba, were essentially the same as those of St. Benedict; and in the progress of his order the monasteries in Spain and France, as well as those of the order of Columba, united themselves with it. Monte Cassino, the magnificent primitive monastery of the Benedictines, became the model of all others. At that time the monasteries, having no common superiors, were under the immediate control of the bishops in their respective dioceses, and differed from one another in many qualifications of the primitive rule. Not even the colour of their dress was the same. The disciples of Columba wore white garments like the first Benedictine nuns, who originated in France in the sixth century. After the unions which took place at a later period, all the members of this order wore black, as the founder is said to have done. The decline of monastic discipline after the eighth century occasioned the reforms of Benedict of Aniana in France, the renewed inculcation of the old rule, and the adoption of new ordinances suited to the times, by the Council of Aix-la-Chapelle (817), as well as the particular rules and fraternities of the celebrated monasteries in France, Germany, and England, which in those barbarous times became seats of civilization; and finally the institution of the Cluniacs, a new branch of the Benedictines, which proceeded from the convent of Clugny in Burgundy, founded in the year 910. The Benedictine monasteries, in the middle ages, were often asylums in which science took refuge and found protection. In place of the discordant and uncertain rules which had hitherto existed, the Cluniacs made fixed regulations concerning the hours of worship, the obedience, discipline, and common government of all the monasteries belonging to their order, which were soon imitated in all Europe. In the twelfth century their order contained 2000 monasteries, whose luxury frequently called for reforms, and finally became the chief cause of their decline. The remains of the Cluniacs united themselves in the seventeenth century, under the patronage of Richelieu, with the Benedictine fraternities of St. Vannes and St. Maurus, the latter of which, founded in 1618, had in the beginning of the eighteenth century 180 abbeys and priories in France, and acquired by means of its learned members, such as Mabillon, Montfaucon, and Martène, merited distinction. To this family belong those new orders established on the foundation and observing the rule of St. Benedict, which have originated since the eleventh century, and are distinguished from the proper Benedictines by their dress, names, and particular regulations; for example, the Camaldulians, the monks of Vallombrosa, the Sylvestrians, the Grandimontenses, the Carthusians, the Cœlestines, the Cistercians and Bernardines, the Trappists, and the monks of Fontevraud (which see). The Benedictine monasteries never constituted one society, constitutionally regulated and governed under an aristocratical or monarchical form: on the contrary, a great many monasteries which descended from the old Benedictines were compelled by the Council of Trent to unite themselves gradually into particular fraternities. Among these the Benedictines of Monte Cassino, of Monte Vergine, and Monte Oliveto (who call themselves *Olivetanians*) in Italy and Sicily, where they have flourished uninterruptedly even to the present time; those of Valladolid and Montserrat in Spain, where they are among the wealthiest orders; those of Hirschau and Fulda, together with Bursfeld, which have now ceased to exist, and that of Mölk in Germany, deserve particular notice on account of the extent of their possessions, the magnificence of their churches, and the mildness of their rules. To the fraternity of Mölk, which still exists, but accommodated to the spirit of the times (the government having ordered its revenues to be applied to the public service), the rest of the Benedictine convents in Austria are joined. Many of the nunneries of this order are reserved for the nobility, because the places in them are equal to the most lucrative benefices. The Benedictines in Sicily, who are for the greater part the younger sons of distinguished families, live under very lax rules. During the first French revolution the monasteries of the Benedictines along with all other monastic orders were abolished; but they have since been at least partially re-established, and the fraternity of St. Maurus especially has again won distinction by its literary and scientific labours.

BENEDICTION signifies the act of conferring a blessing. In the Romish Church *Benedictio beatica* or *Viaticum* is the blessing of the penitent sick. *Benedictio sacerdotalis* is the nuptial benediction pronounced by the priest on the occasion of a wedding. —*To give the benediction* is an expression used with regard to the pope, the cardinals, bishops, or papal nuncios, when they bestow a blessing, either in the church or in the street, with the sign of the cross, on the people, or some private person. The pope gives a solemn benediction three times every year, viz. on

Maundy-Thursday, on Easter, and on Ascension-day.

BENEFIT OF CLERGY, was a privilege of clergymen, which originated in a superstitious regard for the church, whereby the clergy of Popish countries were either partially or wholly exempted from the jurisdiction of the lay tribunals. It extended in England only to the case of felony; and though it was intended to apply only to clerical felons or clerks, yet as every one who could read was, by the laws of England, considered to be a clerk, when the rudiments of learning came to be diffused almost every man in the community became entitled to this privilege. If it was a layman who claimed this privilege he was branded with a hot iron on the left thumb, for laymen were not permitted to receive the benefit twice. Benefit of clergy, as it often grossly interfered with the regular course of justice, was at last abolished by 7 and 8 Geo. IV. c. xxviii. s. 6.

BENEVENTO, a province of the Kingdom of Italy, with an area of 680 square miles, and a population at the end of 1871 of 231,914. The surface is hilly, but the soil fertile in corn, fruit, and pasture. Game is very abundant; and the Sabato, which joins the Calore from the S., teems with fish. Cattle, grain, wine, oranges, and dead game are exported. Benevento was originally called Maleventum; but this was changed to Beneventum by the Romans when they founded a colony here after the defeat of Pyrrhus. Before it came into the hands of the Romans it belonged to the country of the Samnites. The Lombards in 571 made it a dukedom, which, long after the extinction of the Lombard kingdom, remained independent. At a later period it fell into the hands of the Saracens and Normans. The city, however, was not conquered by the latter, because Henry III. had given it to the pope, Leo IX. In 1418 Benevento became part of Naples, but was given back to the pope by Ferdinand I. In 1798 it was conquered by the French, and handed over to Naples; and then in 1806 Napoleon made a present of it to his minister Talleyrand, who received thence the title of Prince of Benevento. In 1815 it was restored to the pope, and finally with Naples was annexed to the Kingdom of Italy.—The city of Benevento (lon. 14° 38′ E.; lat. 40° 6′ N.), on a hill between the rivers Sabato and Calore, has 20,133 inhabitants, eight churches, and nineteen convents. Since 969 it has been the see of an archbishop. It has several manufactories. Few cities in Italy deserve so much attention on account of the antiquities which they contain as Benevento. Almost every wall consists of fragments of altars, sepulchres, columns, and entablatures. Among other things the well-preserved, magnificent triumphal arch of Trajan, built in 114, deserves particular mention. It is now called *Porta Aurea* (the golden gate), and is a gate of the city. The cathedral is a gloomy building in the old Gothic style.

BENEVOLENCE, the name given rather incongruously to a forced loan or contribution, by which the Kings of England were wont, without any sanction from Parliament, to levy money from their subjects. Such benevolences had been denounced by Magna Charta; and even Richard III. had allowed the only parliament of his reign to enact a statute declaring them illegal; but they still continued under some shape or other till they were finally abolished by the Bill of Rights in 1689.

BENGAL, a name applied to a presidency, lieutenant-governorship, and a province of India. The presidency of Bengal is the largest and most important of the three presidencies into which British India is divided. It stretches across the whole of the N. of India, from the Birman Empire to Afghanistan, and includes the subdivisions Bengal, the North-west Provinces, and the Punjab, each of which is under a lieutenant-governor; Oude, the Central Provinces, and British Burmah, each under a chief commissioner; and the three territories of Hyderabad, Mysore, and Coorg, which are under the immediate rule of the Governor-general of India. The area of the whole presidency is 687,453 square miles, and the pop. 143,186,902. But the name Bengal is now more usually applied either to the part of the presidency under the Lieutenant-governor of Bengal, or to the province which forms a part of that district. The area of the former is 246,829 square miles, and the pop. in 1872, 66,524,628. The province of Bengal is what is most generally signified when Bengal is spoken of. It is situated between lat. 21° and 27° N., and lon. 86° and 93° E. It has an area of nearly 100,000 square miles, and a pop. of about 25,000,000. It is bounded N. by Nepaul, Bootan, and Assam; S. by Orissa and the Bay of Bengal; E. by Assam, Cachar, and Burmah; and W. by the province of Bahar. Its general physical character is that of a champaign country, there being few remarkable elevations within its limits, though surrounded with lofty chains of mountains; the N. part resting on the terraces of the Himalaya Mountains, the E. being bounded by the Garos or Garrows chain, and the W. being ribbed with offsets of the Vindhya Mountains. It is intersected in all directions by rivers, the principal of which are the Ganges and Brahmapootra, whose annual inundations render the soil which they reach extremely fertile, particularly in the production of rice, of which it yields immense crops. In those tracts where this advantage is not enjoyed the soil is thin, seldom exceeding a few inches in depth. Notwithstanding, however, the general fertility of the country the crops sometimes fail, chiefly through the abundance of the periodical rains, when all the horrors of famine ensue—the unfortunate natives dying by thousands of starvation. The most inhospitable part of Bengal is what is called the *Sunderbunds* (from being covered with the soondru or sunder tree), that portion of the country through which the numerous branches of the Ganges seek the sea, or the space lying between the river Hoogly and Chittagong, about 150 miles from E. to W., and about 160 from N. to S. This district is infested with tigers, is traversed in all directions by water-courses or nullahs, and interspersed with numerous sheets of stagnant water called jheels, which abound with fish and water-fowl, and are much resorted to by alligators. The greater part of these contain no water during the dry season.

Geology and Minerals.—In the N. part of Bengal, at the foot of the Himalayas, is a band of tertiary formation; S. from which, and along the course of the Ganges, more especially E. from that river, and including the greater part of its delta and that of the Brahmapootra, the country is wholly composed of alluvium or modern detritus. Calcutta stands upon strata of the transition series, which stretch W. into Bahar, and are flanked N. and S. by tracts of crystalline formation. In the Garos Hills coal, iron, and limestone are found; and nitre effloresces on the surface round Calcutta and elsewhere. Mineral springs are not numerous.

Rivers.—The principal rivers, besides the Ganges and Brahmapootra, the latter of which enters the province at its N.E. extremity, and falls into the Bay of Bengal near the principal embouchure of the Ganges, are the Soobunreka, which falls into the Bay of Bengal, in lat. 21° 35′ N., S.S.W. of the Hoogly; the Cosi or Coosee, which rises near Khatamandoo in Nepaul, and falls into the Ganges near Bhagulpore, in lat. 25° 20′ N.; and the Dumooda, which, rising in Bahar, falls into the Hoogly about 22 miles

below Calcutta. There are numerous other streams of less note, mostly tributaries of the Ganges and Brahmapootra, or their larger affluents.

Climate.—There is more regularity in the changes of the seasons in Bengal than perhaps in any other part of India; but it is subject to great extremes of heat, which, added to the humidity of its surface and the heavy dews that fall, renders it generally unhealthy to Europeans. The prevalence of hot winds, which are sometimes loaded with sandy particles, is another source of disease. The seasons are distinguished by the terms hot, cold, and rainy. The hot season continues from the beginning of March to the end of May, within which period the thermometer frequently rises to 100°, sometimes to 110°. The month of September is also often intensely hot, and when so is the most unhealthy period of the year to natives as well as Europeans, owing to the profuse exhalations from stagnant waters left by the inundations, and from a rank decaying vegetation. The rainy season commences in June, and lasts till October. During the first two months of this period the rain is frequently so heavy that 5 inches of water have fallen in one day, the annual average being from 70 to 80 inches. It is in this season that the inundations take place, and that the Ganges overflows its delta, covering the land with its waters for more than 100 miles. The cold season, the most grateful and healthy of any to Europeans, continues from November to February, during which period N. winds prevail, with a clear sky.

Natural Productions.—Almost all kinds of grain and pulse are grown in Bengal; but rice (called also *paddy*) is the most generally cultivated, being found in almost every part of the province in an endless variety of species. Forming the chief article of food much care is bestowed on its cultivation; embankments are formed to retain the water indispensable to its growth on the plains, and reservoirs are formed on the higher grounds for irrigating the lands below. Millet (called also *jowary*) is also extensively cultivated, and in the W. districts large quantities of maize are grown. At the commencement of the colder season wheat and barley are sown, and are reaped before the rains set in. The next most important vegetable productions of the province are cotton, indigo, tobacco, sugar-cane, mulberry, and poppy, from which opium is manufactured. The fruits are pine-apples, citrons, lemons, limes, oranges, pomegranates, grapes, almonds, tamarinds, and plantains. Apples and pears are met with in the N. districts, but there only. Orchards of mango-trees are to be found in every part of Bengal, the fruit being held in the highest estimation, and in general demand during the hot months. Few countries equal, and none surpass, Bengal for useful timber.

Animals.—The wild animals are lions, tigers, elephants, boars, bears, wolves, foxes, jackals, hyenas, leopards, panthers, lynxes, hares, deer, zebras, buffaloes, antelopes, apes, and monkeys. The most formidable of all these animals, not excepting the lion, is the tiger, which here attains its utmost size, and perhaps also its greatest ferocity. The domestic animals are native horses, thin, ill-shaped animals, and not well adapted for any kind of labour; cattle, of a very inferior breed, being extremely small and miserable-looking; sheep, likewise of diminutive size, with very coarse hairy wool, but when well fed their flesh is excellent. Hogs and goats are also plentiful, and buffaloes are domesticated for the sake of their milk. Reptiles are numerous and formidable, including gavials, a kind of crocodile, with which the larger rivers are infested; and amongst the serpent tribe, many of which are highly poisonous, the deadly cobra-de-capello. Turtles, frogs, and lizards also abound, with swarms of mosquitoes. The turtle are chiefly procured from the island of Cheduba, in the Bay of Bengal. Fish are so exceedingly plentiful as to be within the reach of almost every class of inhabitants. Game, poultry, and water-fowl of all descriptions abound in Bengal, particularly ducks, of which there is a great variety, and most of them of a superior kind. The gigantic crane, commonly called the adjutant, from the stately air with which he struts about, frequents the towns in considerable numbers, performing the office of scavenger by clearing the streets of garbage, in consideration of which duty he enjoys an entire immunity from all disturbance; his principal food is offal, toads, lizards, serpents, and insects. Crows, kites, sparrows, and other small birds are numerous.

Agriculture.—There being few gardeners by profession in India, vegetables are grown mostly by farmers, who, however, meet with little demand for them from the natives, who have never acquired a relish for them, not even for the potato, which is rarely to be met with, excepting in the gardens of Europeans. The plant called *pat*, from which a stout cordage and a coarse kind of cloth is made, is largely cultivated in Bengal. It will grow on almost any description of land; is sown generally in May, and cut down in August and September. It attains to a height of 5 or 6 feet, and after being cut is steeped in water for about ten days, when it is reduced to a substance like hemp. The greater part of this crop is cultivated by those who use or manufacture it, almost all the Hindoo farmers weaving cloth from it. About a fourth part of the whole is sold for exportation. The sunn-plant, a plant somewhat resembling the Spanish broom, is now pretty extensively cultivated and exported to this country, affording excellent material for both sails and cordage, and being made into fishing-nets by the natives. Cotton is grown over all India, but the best of the herbaceous kind is raised in Bengal and on the Coromandel coast; the finest grows on light rocky soil. The cotton seed is sown in the latter end of October, and is gathered between the middle of April and the middle of June, the produce varying from 500 to about 800 lbs. an acre. In the absence of rain the cotton field is watered every eight or twelve days, four men watering about an acre a day. The cotton of India is generally inferior to that of North and South America; but this is believed to be wholly owing to careless cultivation, and to the slovenly manner in which it is prepared for the market. Sugar-cane is cultivated throughout the whole valley of the Ganges, but not to such an extent as might be expected. The export of sugar in 1869 was only 199,348 cwts., of an estimated value of £215,952. Where a proper system of agriculture is observed, one crop only of sugar-cane is grown on the same field in three years. There are two kinds of sugar-cane, the Khagra and Kajoli. The former is a yellow hard cane, about the thickness of a finger; the other is much thicker, is deeply stained with purple, and often attains a height of 12 and 14 feet. The Kajoli is by far the most productive, but the most troublesome to cultivate, and therefore avoided by the most indolent farmers—the land on which it is grown requiring ten or twelve double ploughings, and a great deal of manure. These ploughings take place between October and January; the cuttings, about a foot in length, are planted in February and March, and are cut between the middle of December and the end of the following March. Extensive farmers, and these only, cut so much as an acre of cane in a year. One mill, and one set of implements used in inspissating the juice, thus serve for several farms. The mill and implements generally belong to some wealthy man, who lets them out

on hire. Although the expense of cultivating sugar is more than that of cultivating grain, the profit accruing from the former is considerable. Tobacco, which requires a light soil, is grown in three different situations—in rich spots of land contiguous to the farmer's house—in high land suitable for the growth of sugar-cane, and often alternating with that crop—and on the banks of rivers. The crop is generally largest in the first of these situations, and most scanty in the last. The betel-leaf, famous for its intoxicating quality, and largely used over all India on that account, is cultivated in what is called a *voroj* or fort, and is carefully protected from the sun and wind. So great a luxury is this plant considered, and such the importance attached to it, that its cultivators form one of the nine tribes of tradesmen that were admitted to be pure. A betel garden lasts from twelve to thirty years, yielding the best return of any land in Bengal. Indigo being one of the principal articles of foreign commerce with Bengal, is extensively cultivated in that province. It is however a very uncertain crop, and both the soils chosen for it and the seasons for sowing it are various. The land most commonly selected is high, sandy, and in general poor. The seed is sown broadcast in March, April, and May, and is fit for cutting in four months after; its cultivation is neither so laborious nor expensive as that of rice. Indigo is also grown on the flat sandy banks of rivers, which are inundated in the rainy season; but here the additional risk is run of the waters rising earlier than usual, in which case the crop is overwhelmed and entirely lost. It is remarkable that the produce of indigo in Bengal has not increased in any degree for the last thirty years.

The luxuriance of vegetation in Bengal is perhaps unequalled in any other part of the world. The cultivation of the land requires little effort, and large crops are obtained without the application of any other manure than the sediment or mud deposited by the inundations. It is doubtful, however, how far this facility is good, since it seems to have had the effect of preventing all attempts at improvement either in the science of agriculture itself, or in the implements used in its practice. The Indian plough is of wretched construction, having neither coulter nor mould-board, and in some districts it wants even the share, while the animals by which it is dragged, two oxen or cows, are miserable half-starved creatures. The reaping-hook (*kastya*) is a most inefficient implement—the curved or cutting part of the blade is 6 inches long by 1½ broad, with teeth like a saw—the handle is about 4½ inches long. The dengki, by which the husks are separated from the grain, is another wretched implement, and so ill adapted to its purposes that one-fifth part of the whole grain is sacrificed in the operation. Nearly all the other implements in use are of an equally rude and imperfect description. Rotation of crops and the use of fallows are unknown to the farmers of India; the land is generally in an exhausted condition, and the inclosures everywhere bad. Grain is trodden out by oxen, and stacking corn is unusual, the corn being often left exposed to the weather. Irrigation, however, is well understood—necessity giving rise to invention—and is accomplished by the most ingenious and efficient means. Farms are generally small, varying from 1 to 20 acres, and are oppressively high rented; the consequence is that the farmers are most of them miserably poor, and are without the means of effecting improvements of any kind. Another obstacle to improvement is the mixture of occupations—the peasants indifferently quitting the plough to use the loom, and the loom to resume the plough.

Manufactures.—The principal manufactures are cotton piece-goods of various descriptions, calicoes, blanketing, diaper, chintzes, woven silks and taffetas, pack-thread and sail-cloth. Muslins of the most beautiful and delicate texture were formerly made at Dacca, a city in this province, but the manufacture is now extinct. 'Some of these fabrics,' says Tavernier, 'were so fine that they could hardly be felt in the hand, and the thread when spun was scarce discernible.' In Ward's History, &c., of the Hindoos this character of the muslin of Dacca is confirmed; though perhaps in both cases it is a little exaggerated. 'When this muslin is laid on the grass,' says the latter, 'and the dew has fallen upon it, it is no longer discernible.' In the hyperbolical but poetical language of the East these delicate airy fabrics were designated as 'webs of woven wind.' The extraordinary fineness and beauty of India muslins, manufactured under the disadvantages of rude machinery and ill-prepared material, is attributed to the exquisitely fine sense of touch possessed by the Hindoos, an effeminate people, to their patience and gentleness, and to the hereditary continuance of a particular species of manufacture in families through many generations. The delicate formation and flexibility of their fingers is equally remarkable, and presents a striking contrast to the rigid clumsy fingers of the European. The extinction of the muslin manufactures of India has been owing in a great measure to the successful competition of this country, and to the circumstance of British fabrics being subject to no duty in Bengal, while high duties were levied on the fabrics of Bengal in Britain. In 1831 a great number of natives of the highest respectability individually petitioned the lords of the privy-council 'to allow the cotton and silk fabrics of Bengal to be used in Great Britain free of duty, or at the same rate which may be charged on British fabric consumed in Bengal.' The petition was not complied with. Large quantities of a coarse cloth called *tat* or *choti*, manufactured from pat, a plant formerly spoken of, are made in various districts of Bengal, and many of the poorer people are clothed with a coarse linen (*megili*) prepared from the same material.

Commerce.—The trade of Bengal with Britain is at once extensive and various. The chief imports are metals, foreign wines and spirits, beer, woollen and cotton cloths, cotton yarn, glass, and hardware; the exports, silk and silk manufactures, cotton, indigo, sugar, saltpetre, and lac dye. Bengal has also a considerable trade with France, China and Japan, Straits Settlements, &c. The total imports of merchandise into Bengal in the year ending 31st March, 1871, were valued at £17,055,258; the exports of merchandise during the same period at £22,935,332. The treasure imported was £1,533,448; exported, £518,565. In 1849–50 the imports into Bengal were of the value of £6,497,114, the exports £10,932,712.

People, Education, Social and Domestic Condition, &c.—The natives of Bengal are generally handsome, particularly when young, though slightly formed, and small of stature; their colour varies from light olive to dark brown; faces oval, hair and eyes universally black. Their dispositions are lively, and their manners mild and polite; but their bad qualities are numerous, and their moral character generally exceedingly low. They are overbearing to inferiors; strangers to truth, honesty, and good faith, and incorrigible cheats and pilferers. The lower classes live in a state of continual warfare with each other, and there are few families without internal divisions, accompanied by the most bitter and lasting enmities. They want courage to meet their enemies in open combat, and to commit thefts attended by danger; but have little hesitation in murdering and robbing when darkness or other circumstances promise a safe perpetration of these crimes.

It is a necessary consequence of the extreme poverty of the bulk of the population of India, that education should be there at a very low ebb. The first rudiments of education are usually given in small schools called *patshalas*, in which the fees are extremely low, and in which only reading, writing, and arithmetic are taught. The greater number of these schools are free from government control, but a large and important body of educational institutions which are to a great extent fed from the village patshalas are connected with government. The highest of these institutions is the Calcutta University, with the four faculties of arts, law, medicine, and engineering. The entrance examination is open to all persons who have attained the age of sixteen years; but if they wish to proceed farther, they must enter one of the colleges or schools affiliated to the university. Of these affiliated institutions, the first are, the general colleges, or those which instruct in the course of the faculty of arts. Next to these come the special colleges, under which term are included law classes attached to general colleges. Then there are the higher-class English schools, which educate up to the standard of the university entrance examination; the middle-class English schools, educating up to a standard two years below the former; the middle and lower class vernacular schools, normal schools, &c. An important auxiliary to the schools of the province is furnished by the system of scholarships by which the best instruction is brought within the reach of the poorest student. The number of pupils in state schools and colleges was 163,854 in 1870–71. Children usually go to school at five years of age, and are instructed in reading and writing at the same time, tracing letters on the floor with a pencil of steatite; at a more advanced stage they write on the palmyra-leaf with a pen (made of reed or bamboo) and ink; afterwards they begin to write on paper, and learn to keep accounts. In the common languages of the country there were till lately almost no books to be had; but the Bible, or parts of it, has now been printed in the various languages and widely circulated, as well as a considerable number of other works. The English language is now, however, making rapid strides everywhere in India.

The private houses of Bengal are huts, with pent-roofs, constructed of two sloping sides which meet in a ridge. One hut of this kind serves the poor man for himself, family, and cattle; wealthy men increase the number of houses without altering the plan, and without having any communication between the different apartments. The walls are generally made of mud, and the floor is raised a foot or two above the level of the plain, to prevent its being flooded in the rainy season, which, however, is not always accomplished, in which case the family have to wade through mud to reach the door. The frames of the houses consist of bamboos tied together—wooden posts and beams being used in the construction of the houses of the wealthy only. The huts collectively sufficient for the accommodation of a family are usually surrounded by a common fence. Farmers have in general larger and better houses than people living in towns. A rich farmer will sometimes have as many as twelve or fourteen huts within his inclosure.—The expense of maintaining the table of a Hindoo family of high rank and station, with eight domestics, exclusive of the master and mistress, has been estimated by Mr. Masters at about £167 per annum. The maintenance of a common labourer, with a wife and two children, is estimated at between £8 and £9 per annum—his whole expenses at about £12. Intermediate classes, with one or two more in family, vary according to position from £87 to £33 and £15 per annum for food alone, which consists chiefly of rice, wheaten flour, fish, vegetables, and butter, with various condiments and seasonings. In the case of the labourer there is neither flour, fish, vegetables, nor butter, the chief food of that class being a coarse description of rice.

History.—The English first established themselves in Bengal in 1656, when, through the influence of an English medical man named Boughton, the East India Company obtained the sanction of the Emperor of Delhi to locate themselves on the right bank of the river Hoogly. Thirty years afterwards the Company's factors, having had a rupture with the Moslem commander at the place where they were located, removed to Calcutta, then the village of Chuttanutty, where they continued to carry on their trade. In 1700 the Viceroy of Bengal, being in want of money to dispute the succession to the Mogul throne, obtained a large sum from the Company for the township on which their factory stood at Calcutta, and some adjacent lands. Seven years afterwards, namely, in 1707, Calcutta was erected into a presidency, and the foundation of British power in India laid—presenting a striking proof of the superior energy of the British character, there having been settlements in India by the Portuguese, Dutch, French, and Danes, previous to, and contemporary with, the location of the English in that quarter of the world; but the mighty achievement of attaining the supremacy in that vast empire could, it appears, be accomplished only by the British. For nearly half a century the Company pursued a peaceful and profitable commerce; but at the expiry of that period, 1756, Calcutta was attacked and taken by the Soubahdar of Bengal, who threw the Englishmen he found there, 147 in number, into a dungeon, the well-known *black hole* of Calcutta, where 123 of them perished in eleven hours. In the ensuing year Calcutta was retaken by Lord Clive—an event which was followed by a series of victories on the part of the British that terminated in the entire conquest of India.

BEN-GAZI, a town in the regency of Tripoli, capital of Barca, and next to Tripoli the most important seaport of the regency. It stands on the E. coast of the Gulf of Sidrah, on a sand dune separated from the mainland by a salt-water lagoon. It is wretchedly built, most of the houses being constructed of mud or of rough stones cemented with mud. The harbour is fast becoming sanded up, and admits only small vessels; but there is still a considerable trade, cattle, corn, &c., being exported, especially to Malta. The principal buildings are the government house, the barracks, and the Franciscan monastery. Pop. 6000–7000.

BENGEL, JOHN ALBANUS, a famous German theologian, born in 1687 at Winneden in Würtemberg, studied at Stuttgart and Tübingen, and in 1713 became a preacher and professor at Denkendorf. His chief studies were the fathers of the church and the New Testament. He died, after having been appointed to several offices, in 1752. Bengel was the first Lutheran theologian who applied to the criticism of the New Testament a comprehensive spirit, which embraced the subject in its whole extent, and manifested the power of patient investigation which the study required. His suggestions for the correction of the text are particularly valuable.

BENGER, ELIZABETH OGILVY, an historical authoress of some note, was the daughter of a purser in the navy, and born at Wells, Somersetshire, in 1778. She early displayed a turn for literature, but her straitened means preventing her from gratifying this taste by the purchase of books, she was in the habit of perusing the opened books in a bookseller's window, and would return day after day to see if the page had been turned over. In 1802 she removed with

her mother to London, and was then enabled through the kindness of friends to procure the means of improving her mind and extending her studies. Her first literary attempts, including a poem on the abolition of the slave-trade and two novels, attracted little attention; but having directed her energies to historical biography, her labours in this department were attended with greater success. The principal of these are her Memoirs of Mary Queen of Scots, and of Elizabeth Queen of Bohemia. She also wrote the Lives of Anne Boleyn, of Mrs. Elizabeth Hamilton, and of John Tobin, the dramatist. Miss Benger's chief merits are the clearness of her style and her industry in the collection and arrangement of facts. Throughout her life she suffered much from ill health. She died in 1827.

BENGUELA, a little-known district belonging to the Portuguese on the W. coast of South Africa, lying between lat. 11° and 17° S., and bounded, N. by Angola, E. by the Cunene River, S. by Nourse's River, and W. by the Atlantic Ocean. The interior of the country is mountainous, the direction of the elevated lands being from N.E. to S.W. It is well watered, having numerous springs and lakes, many of the latter brackish, and some salt; and being thickly intersected by rivers and streams. Its vegetation is luxuriant, including every description of produce peculiar to tropical countries. The slopes of the mountains are covered with dense forests of cedars, palms, date-trees, tamarinds, &c. The vine, the banana, ananas, and other descriptions of tropical fruit, also abound. The soil is well adapted for the production of grain; but from indolence and want of skill on the part of the natives, little is grown. The larger and fiercer animals of the African wilds are numerous in this district, such as lions, rhinoceroses, elephants, and hippopotami. Zebras, deer, and antelopes are likewise abundant. Horses are scarce, but cattle, sheep, and goats plentiful. The ostrich and the peacock are found here, the latter wild in the woods. Reptiles of all sorts, harmless and dangerous, are met with everywhere. The mineral wealth of the district consists of copper, sulphur, petroleum, and crystals. Gold and silver have also been found.

BENGUELA, a town on the W. coast of Africa, capital of the above district, on a bay of the Atlantic, in a charming but very unhealthy valley. It consists of well-built houses, for the most part of a single story, and roofed with tiles. The streets are wide and regular, and lined on each side with fine trees. Trade is very limited, and only shows some activity when the caravans arrive, bringing ivory, wax, gum copal, &c. Pop. estimated at 3000.

BENHADAD, the name of three kings of Syria. They are all mentioned in Scripture; but the most conspicuous is the second, who was equally remarkable for his arrogance in prosperity and his craven spirit in adversity. He first sent an insolent message to Ahab, claiming himself and all his subjects as his slaves; and after Ahab, with more spirit than he usually manifested, encountered and signally defeated him, Benhadad, who had narrowly escaped being taken prisoner, sent a message abjectly begging his life. Ahab was impolitic enough to grant it, and Benhadad, disregarding all his promises, proved a bitter and formidable enemy to his successor. He was at last murdered by his captain, Hazael, about B.C. 890.

BENICARLO, a seaport of Spain, in Valencia, in the province of Castellon, surrounded with walls, having an old castle, a fine church, manufactures of ropes and sail-cloth, and tanneries, distilleries, &c. It is chiefly noted as being the place of export of the red wines called by its name which are produced in great abundance in the surrounding country. These wines are chiefly sent to Bordeaux to be mixed with clarets, or to England to be manufactured into port. Pop. 6989.

BENIN, a negro country or kingdom of West Africa, on the Bight of Benin, Gulf of Guinea, extending along the coast on both sides of the Benin River, and to some distance inland, but the limits are not accurately known. The capital is Benin, a town of some 15,000 inhabitants, situated on the river Benin or Formosa, one of the mouths of the Niger, consisting of clay-built houses neatly thatched with reeds, straw, or leaves. The coast is thickly indented with estuaries, some of them of considerable breadth, and studded with islands. The country is flat for some distance inland, when it begins gradually to rise, till it attains a height of between 2000 and 3000 feet. It is very well wooded, and being likewise well watered, it is rich in all the vegetable productions of the tropics. Cotton is indigenous, and its wool is woven into cloth by the women. Sugar-cane of good quality is grown; the soil is laid out in square plots, producing yams, plantains, Canada and Indian corn. The religion is Fetichism. Human sacrifices are numerous, and cruelty, in its most atrocious forms, is characteristic of the people and the government. There is a considerable trade in salt, palm-oil, and blue coral, and also in slaves.

BENI-SUEF, the capital of a province of the same name in Middle Egypt, and one of the chief trading places of the country, is situated on the left bank of the Nile, 70 miles S. from Cairo and 20 miles S.E. of Faioum, of which town it is the port. An annual and well-frequented market is held in the neighbourhood. Pop. 5000 to 6000.

BENJAMIN DE TUDELA, so called because born at Tudela, in Navarre, in the twelfth century, is chiefly known by his travels over large portions of Europe, Palestine, Mesopotamia, the East Indies, and Ethiopia. As the first European traveller who penetrated far into the East, he furnishes a great amount of curious and interesting information, and though by no means free either from error or fable, proves himself worthy of the high estimation in which he has always been held among his Jewish countrymen for the soundness of his judgment and the extent of his learning. His Itinerary, first printed in Hebrew at Constantinople in 1543, was translated very imperfectly by Arius Montanus into Latin, afterwards by the celebrated youthful genius Baratier into French, and also into English and Dutch. The best edition of the Itinerary is that of Asher (London and Berlin, 1840–41), which contains an English translation.

BENLAWERS, a huge pyramidal mountain in Breadalbane, Perthshire, on the N. bank of Loch Tay, 3945 feet above the level of the sea.

BENLEDI, a mountain lying N.W. of Callander, Perthshire, reaching to the height of 3009 feet above the level of the sea. It was one of the chief places of public worship of the Druids. On its top there is a small loch.

BENLOMOND, a mountain on the western extremity of Stirlingshire, on the E. shore of Loch Lomond, of a longitudinal shape, and consisting more of a collection and pile of swelling knolls than of a single hill. It is divided into three great stages in the ascent, each rising above the other to the top, which has an elevation of 3195 feet above the level of the sea. On the south-eastern side it presents a sheer precipice of about 2000 feet. From the river of Rowardennan, on the E. shore of the loch, to the summit, the distance is 6 miles of a continued ascent, which in general requires three hours. The lower part of this mountainous cluster is well wooded and verdant, and the upper regions afford excellent

heathy pasture. It commands a most extensive prospect of the vale of Stirlingshire, the Lothians, the Clyde, Ayrshire, Isle of Man, hills of Antrim, and all the surrounding Highland territory. Like Benlawers this is one of the botanical gardens of the Highlands.

BENMORE (the great mountain), a conical hill betwixt Loch Dochart and Loch Voil, western part of Perthshire, among the Braes of Balquhidder. It rises to an elevation of 3818 feet above the level of the sea.

BEN-MUICH-DHUÍ, or BEN-MAC-DHUI, the second highest mountain in Scotland, is situated in the south-west corner of Aberdeenshire, on the borders of Banffshire. It is a granitic mass, rising to the height of 4296 feet, and forms one of a cluster of lofty mountains, among which are Brae-riach, Cairntoul, Cairngorm, Ben-a-bourd, and Ben-A'an. Its upper parts are bare of vegetation. The view from the top includes the Moray Firth, the hills of Caithness and Sutherland, Bennevis, Benmore, &c.

BENNEVIS, now ascertained to be the most lofty mountain in Great Britain, is situated in the south-western extremity of Inverness-shire, immediately E. of Fort-William and the opening of the Caledonian Canal into Loch Eil. It rises from the brink of the latter piece of water to the height of 4406 feet. In clear weather a view can be obtained from its summit athwart nearly the whole of the N. of Scotland from sea to sea. It consists principally of a fine brown porphyry, and contains red granite of a beautiful grain. It has some very lofty precipices, and in its fissures the snow remains unmelted, even in the warmest weather.

BENNINGSEN, LEVIN AUGUSTUS, BARON VON, Russian commander-in-chief, born at Brunswick in 1745, early entered into the Russian service, and distinguished himself by great gallantry in the war against Poland, under the Empress Catharine II. He acted a chief part in the conspiracy of the palace against the Emperor Paul I. In 1806 he was appointed to command the Russian army which hastened to the assistance of the Prussians, but before his arrival the Prussians were defeated at Jena. He afterwards fought the murderous battle of Eylau, and the battle of Friedland. After the peace of Tilsit he retired to his estates. In 1813 he led a Russian army, called the 'army of Poland,' into Saxony, took part in the battle of Leipzig, and blockaded Hamburg. After commanding the army in the S. of Russia, he finally settled in his native country, and died Oct. 3, 1826. He is the author of Thoughts on Certain Points requisite for an Officer of Light Cavalry to be Acquainted with (Riga, 1794; Wilna, 1805).

BENNINGTON, a town in Vermont, U. States, situated in a good grazing country, and possessing considerable trade and manufactures. On Mount Anthony in this town there is a cave containing many beautiful petrifactions. Two important battles were fought here on the 16th of August, 1777, in both of which General Stark at the head of 1600 American militia was victorious over the British. Pop. 2500.

BENNO, ST., of the family of the Counts of Woldenberg, born at Hildesheim in 1010, became (1028) a Benedictine monk in the convent of St. Michael there. Henry IV. (1066) made him Bishop of Misnia (Meissen), and favoured him by repeated donations of estates for his church. Nevertheless Benno took a secret part in the conspiracy of the Saxon nobles against the emperor, for which reason Henry led him away prisoner when he passed Misnia, in 1075, after the battle on the Unstrut. He was afterwards set at liberty, but several times proved faithless to the emperor. He died 1107. His bones began by degrees to work miracles; and Pope Adrian VI., after many entreaties from the Saxons, as well as from the Emperor Charles V., and having received large sums of money, placed him among the saints. It was thought that this canonization would tend to the promotion of the Catholic faith in Saxony. At present the bones of St. Benno are in the city of Munich, which has chosen him for its patron.

BENNOZO, GOZZOLI, a celebrated painter, born in 1400, became the pupil of Giovanni di Fiesole, and the imitator of Musaccio, and soon placed himself at the head of all his contemporaries. He excelled particularly in the representation of splendid edifices, landscapes, animals, and scenes of animation and gaiety. After visiting Rome he settled at Pisa, where his finest pieces are seen. The most celebrated, the Discussion with the Doctors, is one of the principal ornaments of the cathedral.

BENSERADE, ISAAC DE, a poet at the court of Louis XIV., born, 1612, at Lyons-la-Foret, a small town in Normandy, wrote for the stage, and composed a great number of ingenious verses for the king and many distinguished persons at court. In the first half of the reign of Louis XIV. the court, and the followers of the court, patronized songs of gallantry, rondeaux, triolets, madrigals, and sonnets, containing sallies of wit, conceits, and effusions of gallantry in the affected style then prevalent. No one succeeded so well in this art as Benserade, who was therefore called by way of eminence *le poète de la cour*. He received many pensions for his performances, and lived at great expense. Wearied at last with the life which he led at court he retired to his country-seat, Gentilly, and died 1691.

BENSHI, or BANSHEE, an Irish word meaning 'fairy's wife,' and applied to a fay or elf said to attach itself to a particular family, and to appear before the death of any of its members. It was considered rather an aristocratic distinction for any family to have a banshee attached to it, and in the last century every great family in Ireland boasted of that distinction. The Irish banshee is said always to have appeared as a woman, sometimes old and hideous, but sometimes also young and even handsome. Similar superstitions were at one time current with regard to different families in England and Scotland, sometimes a dove being the omen of death, sometimes the wailing as of a woman in distress, and so on.

BENTHAM, JEREMY, a distinguished writer on politics and jurisprudence, was born in 1749. He studied English law, but never appeared at the bar, being enabled by easy circumstances to devote himself entirely to literary compositions. He did not, however, publish his chief works himself. They were arranged and translated into French by his friend M. Dumont, and printed partly in Paris and partly in London. Among them are Traités de Législation, Civile et Pénale, &c. (Paris, 1802, three vols.), and Théorie des Peines et des Récompenses (London, 1801, two vols.) Bentham advocated a thorough correction of civil and criminal legislation. His Fragments on Government, in opposition to Blackstone, appeared anonymously in 1776, and with his name, London, 1823. In France his literary labours found a better reception than in England or Germany. A small pamphlet on the liberty of the press (London, 1821) was addressed by him to the Spanish Cortes during their discussion of this subject; and in another (Three Tracts relative to the Spanish and Portuguese Affairs, London, 1821) he refuted the idea of the necessity of a house of peers in Spain, as well as Montesquieu's proposition that judicial forms are the defence of innocence. One of his latest works

was the Art of Packing (London, 1821), that is, of arranging juries so as to obtain any verdict desired. His previous work, Essai sur la Tactique des Assemblées Législatives, edited from the author's papers by Etienne Dumont (Geneva, 1815), and translated into German, contains many useful observations. His Introduction to the Principles of Morals and Legislation (London, 1823, two vols.) treats of the principal objects of government in a profound and comprehensive manner. Zanobelli has translated Bentham's Theory of Legal Evidence into Italian (Bergamo, 1824, two vols.) Among the earlier works of Bentham was his Defence of Usury, showing the Impolicy of the Present Legal Restraints on the Terms of Pecuniary Bargains (1787). Mr. Bentham died in London, June 6th, 1832, leaving his body to be dissected for the benefit of science. A complete edition of his works, with a biography by Bowring, was published in London (eleven vols. 1843). He was a man of primitive manners, unblemished character, and undoubted earnestness in the cause of the people at large. He is considered the father of the Utilitarians, or those moral political economists who view everything as it is affected by the principle of 'the greatest happiness of the greatest number.'

BENTINCK, Lord William Charles Cavendish, second son of the third Duke of Portland, was born in 1774, and entered the army at an early age. He served in the Duke of York's campaign in Flanders, and also in Italy with the Russian army under Suwaroff, from 1799 to 1801. In 1803 he proceeded to India as Governor of Madras, returned from thence in 1805, and subsequently went to Spain, where he commanded a brigade under Sir John Moore at Corunna. In 1810 he visited Sicily as British plenipotentiary, and commander-in-chief of the English troops. The most noticeable feature of this expedition is his bestowment on the Sicilians of a constitution, which, however, was overturned on the restoration of the Bourbons. He conducted in 1813 the expedition from Sicily to Catalonia, and in 1814 took possession of Genoa on the revolt of the inhabitants from French rule. The same year he returned to England, and subsequently entered Parliament as member for Nottingham. In 1827, under Mr. Canning's administration, he was sent to India as governor-general, and held that office till 1835, when he returned to England. Among the principal events of his administration are the abolition of the practice of suttee, the repeal of the restrictions which prohibited all Europeans, except servants of the Company, from settling in India, and the recognition of the liberty of the press. In 1836 he again entered Parliament as member for the city of Glasgow, but was now unable from ill health to take any active share in political matters. He died at Paris on 17th June, 1839.

BENTINCK, Lord William George Frederick Cavendish, generally known as Lord George Bentinck, was the son of William Henry Cavendish, fourth Duke of Portland, and born on 27th Feb. 1802. He entered the army, but quitted it early to become private secretary to Mr. Canning, who had married his mother's sister. In 1827 he entered Parliament as member for King's Lynn, and continued to represent that borough for the rest of his life. Up to 1846 he was a warm adherent of Sir Robert Peel and his measures; but on the latter announcing himself in that year a convert to free-trade principles, Lord George abandoned his old ally, and came forward as the zealous and indefatigable leader of the Protectionists in the House of Commons. With the assistance of Mr. Disraeli he maintained this position for two years, and though often illogical, and sometimes unscrupulous in his statements, he nevertheless commanded much attention by the vigour and earnestness of his oratory and deportment. He died Sept. 21, 1848.

BENTIVOGLIO, Cornelio, cardinal and poet, born at Ferrara, 1668, of a family that held the highest offices in the former Republic of Bologna. He early distinguished himself by his progress in the fine arts, literature, philosophy, theology, and jurisprudence. While at Ferrara he patronized the literary institutions there. Pope Clement XI. made him his domestic prelate and secretary to the apostolic chamber, and sent him, in 1712, as nuncio to Paris, where, during the last years of the reign of Louis XIV., he acted an important part in the affair of the bull Unigenitus. The Duke of Orleans, regent after the death of Louis, was not favourably disposed towards him; the pope therefore transferred him to Ferrara, and in 1719 bestowed on him the hat of a cardinal, and employed him at first in Rome, near his own person, then as legate *a latere* in Romagna, &c. Bentivoglio died in Rome, 1732. Poetry had occupied the leisure hours of the learned cardinal. Some sonnets composed by him are to be found in Gobbi's Collection, vol. iii., and in other collections of his time. Under the name of Selvaggio Porpora, he translated the Thebais of Statius into Italian.

BENTIVOGLIO, Guy or Guido, celebrated as a cardinal and an historian, was born at Ferrara in 1579. He studied at Padua with great reputation, and afterwards, fixing his residence at Rome, acquired general esteem by his prudence and integrity. He was nuncio in Flanders from 1607 to 1616, and afterwards in France till 1621. His character stood so high, that, on the death of Urban VIII. in 1644, he was generally thought to be the most likely person to succeed him; but on entering the conclave in the hottest and most unhealthy season of the year, he was seized with a fever, of which he died, aged sixty-five years. Cardinal Bentivoglio was an able politician, and his historical memoirs are such as we should expect from such a man. The most valuable of these are his History of the Civil Wars in Flanders, written in Italian, and first published at Cologne, 1630, a translation of which, by Henry, earl of Monmouth, appeared in 1654 (London, folio); his own Memoirs, and a collection of letters which are reckoned among the best specimens of epistolary writing in the Italian language (an edition of which was published at Cambridge in 1727).

BENTLEY, Richard, a celebrated English divine and classical scholar, distinguished as a polemical writer in the latter part of the seventeenth century, was born near Wakefield, in Yorkshire, in 1662. His father is said to have been a blacksmith. To his mother, who was a woman of strong natural abilities, he was indebted for the first rudiments of his education. At the age of fourteen he entered St. John's College, Cambridge. In 1682 he left the university, and became usher of a school at Spalding; and this situation he relinquished in the following year for that of tutor to the son of Dr. Stillingfleet, Dean of St. Paul's. He accompanied his pupil to Oxford, where he availed himself of the literary treasures of the Bodleian Library in the prosecution of his studies. In 1684 he took the degree of A.M. at Cambridge, and in 1689 obtained the same honour at the sister university. His first published work was a Latin epistle to Dr. John Mill, on an edition of the Chronicle of John Malela, which appeared in 1691. It contained observations on the writings of that Greek historian, and displayed so much profound learning and critical acumen as excited the sanguine anticipations of classical scholars from the future labours of the author. Dr. Stillingfleet, having been

raised to the bishopric of Worcester, made Bentley his chaplain, and in 1692 collated him to a prebend in his cathedral. The recommendation of his patron, and of Bishop Lloyd, procured him the honour of being chosen the first preacher of the lecture instituted by the celebrated Robert Boyle for the defence of Christianity. The discourses against atheism which he delivered on this occasion were published in 1694; they have since been often reprinted, and translated into several foreign languages.

In 1693 he was appointed keeper of the royal library at St. James'—a circumstance which incidentally led to his famous controversy with the Hon. Charles Boyle, afterwards Earl of Orrery, relative to the genuineness of the Greek Epistles of Phalaris, an edition of which was published by the latter, then a student at Christ Church, Oxford. In this dispute Bentley was completely victorious, though opposed by the greatest wits and critics of the age, including Pope, Swift, Garth, Atterbury, Aldrich, Dodwell, and Conyers Middleton, who advocated the opinion of Boyle with a degree of warmth and illiberality which appears very extraordinary. In 1699 Bentley, who had three years before been created D.D., published his Dissertation on the Epistles of Phalaris, in which he satisfactorily proved that they were not the compositions of the tyrant of Agrigentum, who lived more than five centuries before the Christian era, but were written by some sophist under the borrowed name of Phalaris, in the declining age of Greek literature.

Soon after this publication, Dr. Bentley was presented by the crown to the mastership of Trinity College, Cambridge, worth nearly £1000 a year. He now resigned the prebend of Worcester, and in 1701 was collated to the archdeaconry of Ely. His conduct as head of the college gave rise to accusations against him from the vice-master and some of the fellows, who, among various offences, charged him with embezzling the college money. The contest was much protracted and occasioned a lawsuit which, after lasting more than twenty years, was decided against him, a sentence being passed depriving him of his mastership; but this sentence his opponents were never able to carry out, being always baffled by Bentley's superior skill and mastery of legal forms. In 1711 he published an edition of Horace at Cambridge, in 4to, which was reprinted at Amsterdam; and in 1713 appeared his remarks on Collins' Discourse on Free-thinking, under the form of a Letter to F. H. [Francis Hare], D.D., by Philelcutherus Lipsiensis. He was appointed regius professor of divinity in 1716, and in the same year issued proposals for a new edition of the Greek Testament, an undertaking for which he was admirably qualified, but which he was prevented from executing in consequence of the animadversions of his determined adversary, Middleton. In 1726 he published an edition of Terence and Phædrus; and his notes on the comedies of the former involved him in a dispute with Bishop Hare on the metres of Terence, which provoked the sarcastic observation of Sir Isaac Newton, that 'two dignified clergymen, instead of minding their duty, had fallen out about a play-book.' The last work of Dr. Bentley was an edition of Milton's Paradise Lost, with conjectural emendations, which appeared in 1732. This added nothing to his reputation, and may, in one word, be characterized as a failure. He died at the master's lodge at Trinity, July 14, 1742, and was interred in the college chapel. As a scholar and a critic Bentley was very distinguished. The best informed of his opponents respected his talents while they were loading him with classical abuse, which he did not fail to return with interest. Now that the prejudices, excited apparently by his personal conduct, have subsided, his pre-eminence in that species of literature which he cultivated is universally acknowledged. The celebrated German philologist, J. A. Wolf, wrote an excellent biography of Bentley in the Analecta, vol. i., Berlin; and an English biography of him was written by Monk (London, 1820).

BENUWE, Benué, or Binué, a river, West Africa, forming the E. branch of the Kwara or Niger. It for some time bore the name of the Chadda, apparently for no better reason than that it had been erroneously represented as an outlet of Lake Chad; but the other, which is the native name, and means 'mother of waters,' is now the one used. The source of the Benuwe is yet unknown; but Dr. Barth, who came upon the river in 1851, while travelling in Adamaua, near the confluence of the Faro, which joins it on its left bank about lat. 12° 30′ E., was told that it comes from the S.E. a distance of nine days' journey. In consequence of this discovery an expedition was fitted out by the British government for the purpose of exploring the Kwara from its mouth upwards, and thereafter tracing the course of the Chadda, then only conjectured, but not actually known to be identical with the Benuwe. The exploration was made in a small steamer called the *Pleiad*, and was under the command of Dr. William Balfour Baikie. After reaching the point of confluence of the Benuwe with the Niger, about lat. 7° 40′ N., Dr. Baikie followed the former eastward for a direct distance of about 370 miles. The point thus reached was about lat. 9° 25′ N.; lon. 11° 30′ E., and 50 miles below the junction of the Faro. He had been obliged to leave the steamer, and perform a few of the last miles in the gig; but there was sufficient depth of water, though the river was only rising, to allow a still further exploration. The natives, however, had begun to display their hostility in such a manner as made it necessary to return. The result was to show that a large, fertile, and populous tract of a region of Africa previously in a great measure unknown, was accessible by means of a navigable river. A second expedition, also under Dr. Baikie, explored the same river in 1857.

BENWYVIS, or Ben Uaish, a mountain in the parish of Kiltearn, Ross-shire, was long supposed to be the second, as to height, in Britain. Such is the great height of Benwyvis, that it is quite conspicuous even from the distance of Inverness, where it looks like a large *hay-sow*, placed amidst a multitude of corn-stacks in a barn-yard. The top of Benwyvis was never known to be free of snow till the singularly hot summer of 1826, when at length the ancient ice that had been crusting upon it from time immemorial was all cleared away. Its height is about 3422 feet.

BENZOIC ACID ($C_7H_6O_2$) exists ready formed in certain balsams (which see), as of Peru and Tolu, in gum benzoin, and in the urine of man and herbivorous animals, and it is, besides, the product of a number of chemical reactions. It is easily obtained from gum benzoin, by heating it for some hours in a pot covered with a paper cap. The acid sublimes, and the cap on removal is found encrusted with light brilliant white prisms, which are almost pure, except a trace of volatile oil, which gives the acid its ordinary odour. The acid can also be extracted in the wet way. When pure it forms crystals, sparingly soluble in cold water, more soluble in hot, and very volatile in aqueous vapour. It sublimes readily; when heated in the air it burns with a bright smoky flame. It forms the salts called benzoates, of which the most important are the alkaline benzoates, and the benzoate of iron, which is employed for separating iron from manganese in solution. See Benzoin.

BENZOIN is a solid, fragile, vegetable substance, of a reddish-brown colour. In commerce several varieties are distinguished, of which the yellow, the Siam, and the amygdaloidal—the latter containing whitish tears of an almond shape diffused through its substance—and Sumatra firsts are the finest. It is imported from Siam, Singapore, Bombay, and occasionally also from Calcutta, and is found also in South America. Benzoin is obtained from the tree called *Styrax benzoin*, and perhaps from some others. On making incisions into the bark, it flows out in the form of a balsamic juice, having a pungent taste and an agreeable odour. The pure balsam consists of two principal substances, viz. a resin and a peculiar acid termed *benzoic* (which see), which is procured from the mass by sublimation. Benzoin is not soluble in water, but is readily dissolved in alcohol, by the aid of a gentle heat. The tincture thus made is used in pharmacy. A small quantity of this tincture dropped into water, forms a white, milky fluid, which is used in France as a cosmetic, under the name of *lait virginal*. The gum is a principal ingredient of the common court-plaster. The acid, as well as the gum, is employed in medicine: they are stimulating, and act more particularly upon the pulmonary system; whence they are used in asthma and chronic catarrh. It is largely used in the ceremonies of the Greek and Roman Catholic churches.

BENZOL. See NAPHTHA.

BEOWULF. See ANGLO-SAXONS—Literature.

BÉRANGER, PIERRE JEAN DE, the songster and national poet of France, was born in Paris on 19th August, 1780, in the house of his grandfather, a tailor in the Rue Montorgueil. His father was a restless and scheming man, and young Béranger, left in a great measure to himself, ran a great chance of spending his life as a *gamin* and vagabond in the streets of Paris. A few days after the destruction of the Bastille he was conveyed to Peronne and placed under the charge of an aunt who kept a tavern, and to whom for a time he acted as waiter. At the age of fourteen he was apprenticed to a M. Laisnez, a printer in Peronne, but after remaining in that employment for some time, was suddenly summoned to Paris by his father, who wished his coadjutorship in the monetary traffic by which he gained his subsistence. A miserable scrambling existence was now that of the young man, who loathed both the business in which he found himself engaged, and the chicanery and intrigue with which it was conducted. The improvidence and prodigality of his father was constantly involving them in difficulties, and Béranger, with as yet no settled vocation in life, was enduring all the hardships and privation which men of genius in a similar position to himself have frequently had to encounter before the recognition of their talents by the world. At one time he thought of accompanying the French army to Egypt, but was dissuaded from doing so by a friend, and continued to occupy his garret in Paris, where, as he informs us, he often lived without a fire, and had his bed wet with rain and snow through holes in the roof. He had now, besides making an unsuccessful attempt in the drama, produced a number of poems, including his Roger Bontemps, Le Grenier, Les Gueux, and Le Vieil Habit. Some of these were sent by him in 1804 to Lucien Bonaparte, in the hope thereby of obtaining some patronage or assistance. In this, probably the only application he ever made for aid in the course of a long life, Béranger was not disappointed. Lucien sent for him, encouraged him to proceed in his poetical career, and as a means of support made over to him his own income to which he was entitled as member of the French Institute. He was afterwards employed in editing the Annales du Musée, and in 1809 received an appointment as clerk in the office of the secretary to the university. Many of his songs had now become extremely popular, and in 1815 the first collection of them was published. A second collection was published in 1821, but Béranger had made himself extremely obnoxious to the Bourbon government by his satires on the established order of things; and in addition to being dismissed from his office in the university, he was prosecuted and sentenced to three months' imprisonment and a fine of 500 francs. A third collection appeared in 1825, and a fourth in 1828, which last publication subjected him to a second state prosecution, an imprisonment of nine months, and a fine of 10,000 francs. Nothing, however, could daunt the poet's indomitable spirit, and in prison he still continued to busy himself in the composition of his songs and lyrical satires upon government. In 1833 he published his fifth and last collection, which contains some of the most powerful effusions of his genius. Shortly after the revolution of February, 1848, he was elected representative of the department of the Seine in the constituent assembly, but sent in his resignation in the month of May of same year. The concluding years of his life were spent in a dignified retirement and the enjoyment of the society of a few literary and cherished friends. He died at Paris on July 16, 1857, and received the honour of a public funeral, at which the most eminent men in France, both of the world of literature and politics, attended.

The great attraction of Béranger's songs is the unequalled grace and sprightliness which they display, combined with great descriptive powers, much comic humour, and occasional bursts of indignation and invective when some social or political grievance is denounced. They are sometimes also, it must be admitted, marked by a tendency to levity and looseness of morals, but in this respect they partake eminently of the French character. No one, indeed, was more thoroughly French than Béranger, and the glory of his beloved *patrie*, as paramount to all other considerations, appears constantly as the inspiring genius of his poetry. The intense nationality of his songs constitutes one of their principal charms, and in this respect he bears some resemblance to Thomas Moore. He has sometimes been called the Burns of France, but though like him essentially a poet of the people, he falls far beneath the pathos and depth of feeling displayed by the Ayrshire Bard in depicting the passion of love. In private life Béranger was the most amiable and benevolent of men, beloved by his friends alike for his social qualities and kindliness of heart, while his charities were so numerous and extensive as often to exceed the bounds of prudence.

BERAR, a large province, Hindoostan, in the Deccan, contains 18,000 square miles, and consists chiefly of an elevated valley at the head of a chain of ghauts or mountain passes. It is watered by the Wurda, Khahan, Wynegunga, and other affluents of the Godavery, and by the Taptee and Mahanuddy, and has a fertile soil, which produces much good cotton, and the best wheat in India. After being ruled by independent sovereigns, it was added in the seventeenth century to the Mogul Empire, was afterwards overrun by hordes of Mahrattas, and at last was nearly equally divided between the peishwa and the Rajah of Nagpore. In 1854 it was incorporated with the British dominions. The two principal towns of Berar are Oomrawuttee and Khamgaon. The former is the official capital of East Berar, and has a pop. of 23,410, among whom are many wealthy traders. The latter, Khamgaon, although its fixed pop. hardly exceeds 10,000, is the largest cotton market in India. A branch line from Khamgaon

to Jhelum brings it into communication with the Bombay and Nagpore Railway. The pop. of the province is estimated at 3,000,000.

BERBERS, the name of a people spread over nearly the whole of Northern Africa. From their name the appellation of *Barbary* is derived. (See BARBARY STATES.) They are considered the most ancient inhabitants of that country. Their different tribes are scattered over the whole space intervening between the shores of the Atlantic and the confines of Egypt; but the different branches of Mount Atlas are their principal abode; while to the south they are bounded by the Negro states on the edge of the Great Sahara, or Desert. The chief branches into which the Berbers are divided are, first, the Amazirgh or Amazigh, or more accurately Mazigh, who are estimated to number from two to two-and-a-half millions, and who inhabit Northern Marocco. They are for the most part quite independent of the Sultan of Marocco, and live partly under chieftains and hereditary princes, and partly in small republican communities. Second, the Shillooh or Shellakah, who number about 1,450,000, and inhabit the S. of Marocco. They practise agriculture and carry on some manufactures, furnishing articles of considerable value for traffic with the Europeans. They are more highly civilized than the Amazirgh. Third, the Kabyles in Algeria and Tunis, who are said to number 960,000 souls; and fourth, the Berbers of the Sahara, who inhabit the oases, and consequently live for the most part at wide intervals from each other. Among the Sahara Berbers the most remarkable are the Beni-Mezâb and the Tuareg. To these we may also add the Guanches of the Canary Islands, now extinct, but undoubtedly of the same race. The Berbers generally are about the middle height; their complexion is brown, and sometimes almost black, with brown and glossy hair. They are thin, but extremely strong and robust. Their bodies are beautifully formed, and there is an elegance in their attitudes only to be found in antique statues. The head of the Berber is rounder than that of the Arab, and the features shorter, but of an equally marked character, although the fine aquiline nose, so common among the latter, is not often seen among the Berbers. The language of the Berbers has no connection with any other known tongue; such of these people as inhabit the northern side of the Little Atlas, and often mingle with the Arabs, speak or understand Arabic; but those who dwell in the interior of the mountains understand no other language than their own. Many of them are often seen at Algiers who do not speak a word of Arabic. In this city they are termed Bedouins, a name given to all the tribes who dwell in tents or temporary huts.

The Berbers often leave their mountains to plunder travellers on the plain; and when they know a caravan is to pass, they assemble in great numbers to attack it. They dwell in huts, consisting of a few stakes driven into the ground, with reeds or small branches of trees tied to them, and the whole covered with clay mixed with a little straw. Some of their huts are built with rough stones, arranged with much art. These dwellings are rectangular, with two gable ends, and are covered with thatch or reeds; they are seldom more than 10 feet high, and are entered by a low and narrow door, which shuts very close; the windows are small holes in the sides, a very few of which are adorned with a piece of glass. These huts are often built in little groups, scattered about in the valleys and upon the sides of the mountains, and in some parts each group of huts is situated in the midst of a plantation, containing all kinds of trees, with a portion of ground laid out as a kitchen-garden.

Although the Berbers have always lived in a state of barbarous ignorance, and have had but little connection with civilized nations, they are a remarkably industrious people. By working the mines in their own mountains they produce lead, copper, and iron. With the lead they manufacture bullets for war and the chase, and with the copper ornaments for their women. It is even said that they work gold and silver, and it is true that their weapons are often ornamented with plates of silver; they also make an immense quantity of base silver coin, which they circulate at Algiers and in other towns. After converting their iron ore into malleable metal, they manufacture gun-barrels, implements of husbandry, and many rudely-formed utensils, which they sell to the Moors and Arabs. They understand the manufacture of steel, from which they make knives, swords, and other sharp instruments, not very elegant in form, but of good quality. They likewise make gunpowder for their own use, but they sell none: this powder is much superior to that made at Algiers. One of their articles of commerce is a species of black soap, which they make with olive-oil, and soda obtained from sea-weed.—The tribes inhabiting the borders of the plain and some of the great valleys breed sheep and cattle in considerable numbers. Their sheep are small, and yield very little wool. They have likewise numerous herds of goats, which supply them with milk, and of the flesh of which they are very fond. Their cows and oxen are of a small species, but their asses and mules are the best in all Barbary, and are much esteemed by the Algerines.

BERBICE, a district of Guiana, formerly belonging to the Dutch, but ceded to Great Britain in 1814; watered by the river Berbice, the Canje, and others. It extends from Abarry Creek on the W. to Corentyn River on the E. along the coast, about 150 miles. The towns are New Amsterdam, the capital, or Fort Nassau, and Old Amsterdam. The productions are sugar, rum, cotton, coffee, cocoa, and tobacco. The coast is marshy and the air damp. A river of the same name flows through the district.

BERCHTOLD, LEOPOLD, COUNT, was born in 1758, and devoted his life to the relief of the wretched. He spent thirteen years in travelling through Europe, and four in travelling through Asia and Africa to assuage human misery. The results of his experience are contained in his Essay to Direct and Extend the Inquires of Patriot Travellers (London, 1796, two vols.) He wrote several pamphlets on the means of reforming the police, which he caused to be printed in different European countries at his own expense, and to be distributed gratis. His prize questions gave rise to many pamphlets and treatises on the means of saving the drowned and seemingly dead. He offered a prize of 1000 florins for the best treatise on beneficent institutions, and was himself the founder of many. From 1795 to 1797 he travelled through Asiatic and European Turkey, chiefly for the purpose of counteracting the ravages of the plague. At a later period he was engaged in making vaccination more extensively known. During the famine that raged in the Riesengebirge (Giant Mountains, in Germany) from 1805 to 1806 he procured corn and other provisions from distant regions. He fitted up the palace Buchlowitz on his estate Buchlau in Moravia as an hospital for the sick and wounded Austrian soldiers. Here this patriot and philanthropist was carried off by a contagious nervous fever, July 26, 1809.

BERCY, a village on the Seine, near its confluence with the Marne, and now forming part of Paris. The Parisian wine merchants have here their stores of wine, wine-vinegar, distilled liquors, &c., so that the commercial business transacted in Bercy is extremely active. It is increased also by several important

tanneries, sugar-refineries, and paper-mills. A large palace, Le Grand Bercy, was built by Levau at the close of the seventeenth century. Pop. 14,495.

BERDIANSK, a sea-port of Southern Russia, in the government of Taurida, on the northern shore of the Sea of Azof, with a pop. of 12,465. It contains many handsome houses, arranged in spacious streets, and has good anchorage, sheltered on all sides except the S. It is the chief entrepôt for the surrounding governments, and exports large quantities of grain, oil-seeds, and wool. It has also a large inland trade in wood, coal, fish, and salt, the last obtained from mines in the vicinity, which are apparently inexhaustible.

BERDITCHEF (Pol. *Berdyczew*), a city, European Russia, government and 129 miles W.S.W. Kiev, and 25 miles S. Jitomir. It is an ill-built place, swarming with Jews, but contains several churches and synagogues, and a large Carmelite convent, in the church of which is an image of the Virgin Mary, the object of pilgrimages. It carries on a considerable trade in corn, wine, cattle, honey, wax, and leather; and it is famous for its quarterly fairs. At these goods to the value of about £600,000 are disposed of, and much business is done, especially with Austrian dealers. An almanac of great repute is printed here. Pop. 52,787.

BEREANS, in modern church history an insignificant sect of dissenters from the Church of Scotland, who take their title from, and profess to follow the example of the ancient Bereans (see Acts xvii. 10–13) in building their system of faith and practice upon the Scriptures alone, without regard to any human authority whatever. They agree with the great majority of Christians, both Protestants and Catholics, respecting the doctrine of the Trinity, which they hold as a fundamental article of the Christian faith; but they differ from the majority of all sects of Christians in various other important particulars. For instance, they say that the majority of professed Christians stumble at the very threshold of revelation by admitting the doctrine of natural religion, natural conscience, &c., not founded upon revelation or derived from it by tradition. With regard to faith in Christ, they insist, that as faith is the gift of God alone, so the person to whom it is given is as conscious of possessing it as the being to whom God gives life is of being alive, and therefore he entertains no doubts either of his faith or his consequent salvation through the merits of Christ, who died and rose again for that purpose. Consistently with the above definition of faith, they say that the sin against the Holy Ghost is nothing else but unbelief. Their mode of practice and church government has little that is different from many other dissenting sects.

BERECHTESGADEN (formerly *Berchtholdsgaden*), a town, Bavaria, circle Upper Bavaria, on the Achen, or Alben, in a pleasant valley at the foot of the two Matzmanns, about 13 miles S. of Salzburg. It has a judicial tribunal, an office of woods and forests, an ancient cathedral church, a Franciscan monastery, a charitable asylum, and a royal palace. The chief manufactures are cutlery and hosiery. The salt mines in the neighbourhood are important, employing 200 miners, who turn out annually about 800 tons of rock-salt. Pop. 1800.

BERENGAR, the name of two kings of Italy in the ninth and tenth centuries.—BERENGAR I., son of the Duke of Friuli by a daughter of Louis-le-Debonnaire, during the confusion which followed on the dissolution of the empire of Charlemagne laid claim to the crown of Italy, and after a civil war obtained it in 888. At a later period, having been invited by Pope John X. to repel the Saracens who were devastating the south of Italy, he was rewarded for his success by receiving from the pope the crown and title of Emperor of Rome. His warlike expeditions had generally been fortunate, and his internal government was generally acceptable to his subjects; but his nobility, jealous of his authority, stirred up a new competitor for the throne in the person of Rudolf II., who invaded Italy in 921, and ultimately obliged Berengar to take refuge in Verona, where a wretch, whose life he had once spared, assassinated him in 924.——BERENGAR II., nephew of the former by a daughter, was at first Marquis of Ivrea, and the throne of Italy was occupied by Hugo, count of Provence, who, by acting the part of a tyrant, had incurred the enmity of almost all the great feudal lords of the kingdom. Berengar, taking advantage of this feeling, put himself at the head of a force collected in Germany in 945, and was almost universally welcomed. Hugo, seeing his case desperate, abdicated in favour of his son Lothario, who reigned nominally for a few years, and was succeeded in 950 by Berengar, in whom all the powers of the government had previously centred. A quarrel with the Emperor Otho in the following year deprived him of his throne, but he was permitted to resume it on agreeing to acknowledge Otho as his liege lord. In a second quarrel he was not allowed to escape so easily. After losing his territories he shut himself up in the fortress of St. Leo, and defended himself bravely till famine compelled him to submit. He was imprisoned at Bamberg, and died there in 966.

BERENGARIO, JACOPO, a distinguished anatomist of the sixteenth century, born at Carpi in the duchy of Modena, took his degree at Bologna, taught anatomy and surgery at Pavia, and returning again to Bologna, finally settled there till a clamour, caused by a rumour that he had got possession of two Spaniards affected with a loathsome disease, and was intending to dissect them alive, obliged him to retire to Ferrara, where he died in 1550. This rumour, caused doubtless by the fact that Berengario looked upon the dissection of the human body as the only means by which the science of anatomy could be advanced, points out the source of the many important discoveries which he made, and the others for which he paved the way, leaving them to be followed out by Vesalius, Eustachius, and Fallopius. He is justly regarded as one of the principal founders of modern anatomy. He was also a dexterous operator, and published a practical work entitled De Cranii Fractura.

BERENGARIUS, or BERENGAR, of Tours, a teacher in the philosophical school in that city, and in 1040 archdeacon of Angers, is renowned for his philosophical acuteness as one of the scholastic writers, and also for the boldness with which in 1050 he declared himself against the doctrine of transubstantiation, and for his consequent persecutions. He was several times compelled to recant, but always returned to the same opinion, that the bread in the Lord's supper is merely a symbol of the body of Christ, in which he agreed with the Irish philosopher John Scotus Erigena. The Catholics ranked him among the most dangerous heretics. He was treated with forbearance by Gregory VII., but the scholastics belonging to the party of the great Lanfranc, archbishop of Canterbury, were irritated against him to such a degree that he retired to the Isle of St. Cosmas in the neighbourhood of Tours in the year 1080, where he closed his life at a great age in pious exercises (1088). On the history of this controversy, which has been very much misrepresented by the Benedictines, new light has been shed by Lessing in his Berengar (1770), and by Stäudlin, who has likewise published the work of Berengarius against Lanfranc. This Berengarius must not be confounded with Peter Berenger of

Poitiers, who wrote a defence of his instructor Abelard.

BERENHORST, Francis Leopold von, one of the first of the writers by whom the military art has been founded on clear and certain principles. He was a natural son of Prince Leopold of Dessau, and was born in 1733. In 1760 he became the adjutant of Frederick II. After the seven years' war he lived at Dessau. He died in 1814.

BERENICE (a bringer of victory).—1. This was the name of the wife of Mithridates the Great, king of Pontus. Her husband, when vanquished by Lucullus, caused her to be put to death (about the year 71 B.C.), lest she should fall into the hands of his enemies. Monima his other wife, and his two sisters Roxana and Statira, experienced the same fate.——2. The wife of Herod, brother to the great Agrippa, her father, at whose request Herod was made King of Chalcis by the Emperor Claudius, but soon died. In spite of her dissolute life, she insinuated herself into the favour of the Emperor Vespasian and his son Titus. The latter was at one time on the point of marrying her.——3. The wife of Ptolemy Euergetes, who loved her husband with rare tenderness, and when he went to war in Syria made a vow to devote her beautiful hair to the gods if he returned safe. Upon his return Berenice performed her vow in the temple of Venus. Soon after the hair was missed, and the astronomer Conon of Samos declared that the gods had transferred it to the skies as a constellation. From this circumstance the seven stars near the tail of the Lion are called *Coma Berenices* (the hair of Berenice).

BERESFORD, William Carr, Viscount, a distinguished commander, was a natural son of the first Marquis of Waterford, and born on 2d October, 1768. He entered the army, and at the age of eighteen, while serving in Nova Scotia, had the misfortune to lose the sight of an eye by an accidental shot. He afterwards served at Toulon, and in Corsica; in the West Indies under Abercromby; and in Egypt under Baird. In 1806 he was raised to the rank of brigadier-general, and the same year commanded the land force in the expedition to Buenos Ayres. Having been ordered to Portugal in 1808, he was intrusted there with the remodelling of the Portuguese army —an office which he accomplished with great success; and in acknowledgment of his services was created a Marshal of Portugal, Duke of Elvas, and Marquis of Santo Campo. He subsequently took part in the siege of Badajoz, and the battles of Salamanca, Vittoria, and Bayonne. For his bravery at the battle of Toulouse he was raised to the peerage, with the title of Baron Beresford, afterwards superseded by that of Viscount Beresford, which was conferred on him in 1823. In political principles he was a high Conservative; and from the share which he took in forwarding troops from England to the assistance of Dom Miguel against the Constitutionalists, was deprived of his field-marshalship in 1826. In 1832 he married his cousin Louisa, daughter of the Archbishop of Tuam, and widow of Mr. Hope, the banker. He died at Bedgebury Park, Kent, on 8th Jan. 1854.

BEREZINA, a river in the Russian province of Minsk, rendered famous by the passage of the French army under Napoleon, Nov. 26 and 27, 1812. Admiral Tchitchakoff, with the Moldavian army, forced his way from the S. to join the main army, which, after Borizoff had been retaken, was to assist the army led by Wittgenstein from the Dwina, and in this manner cut off Napoleon from the Vistula. Napoleon was therefore obliged to make the greatest efforts, notwithstanding immense difficulties occasioned by the nature of the country, the climate, and the critical situation of his troops, to reach Minsk, or at least the Berezina, and to pass it earlier than the Russians. To effect this it was necessary to sacrifice a great part of the baggage and artillery, Nov. 25. After the advanced guard of the Moldavian army had been repelled to Borizoff by Oudinot, and the bridge there burned by them, early in the morning of Nov. 26, two bridges were built near Sembin, about 2 miles above Borizoff, an undertaking the more difficult, because both banks of the river were bordered by extensive morasses, covered, like the river itself, with ice not sufficiently strong to afford passage to the army, while other passes were already threatened by the Russians. Scarcely had a few corps effected their passage, when the greater part of the army, unarmed and in confusion, rushed in crowds upon the bridges. Discipline had long before disappeared. The confusion increased with every minute. Those who could not hope to escape over the bridges sought their safety on the floating ice of the Berezina, where most of them perished, while many others were crowded into the river by their comrades. In this fatal retreat the Duke of Reggio (Oudinot) led the advanced guard, with the Poles under Dombrowsky in front; the rear-guard was formed by the corps of the Duke of Belluno. Nov. 27, at noon, the dear-bought end was gained, and the army, leaving the road to Minsk, took that of Wilna to Warsaw, with the hope of providing for their necessities in Wilna.—Besides the multitudes who were obliged to remain beyond the Berezina, the division of Partouneaux, which formed the rear-guard, was also lost. It was intrusted with the charge of burning the bridges in its rear, but it fell into the hands of the enemy. According to the French bulletins only a detachment of 2000 men, who missed their way, was taken; according to the Russian accounts the whole corps, 7500 men and five generals.

BEREZOV, or Beresoff (the town of birch-trees), a town in Siberia, in the government of, and 400 miles N. from Tobolsk, on a height above the left bank of the Sosva, one of the branches of the Obi. It consists of wooden houses carefully built of large timbers, and generally with high steps in front, and contains three churches and a chapel. Its inhabitants, who are chiefly Cossacks, subsist by the chase and by fishing; they barter furs, skins, fish, &c., for flour, flesh-meat, tobacco, ironware, and brandy, brought by the Tobolsk dealers, whose craft are floated down the Irtish into the Obi. Prince Menzikoff, the favourite of Peter the Great, died here in exile in 1731, having been banished by his grandson Peter II. Pop. 1462.

BERG, an ancient duchy of Germany, forming part of Rhenish Prussia, and now included in governments Arnsberg, Cologne, and Düsseldorf. It extended along the Rhine from the Ruhr to the frontiers of Nassau, and is everywhere hilly. It is more a manufacturing than an agricultural district, and has long been famed for its minerals, which include iron of the finest quality, lead, copper, zinc, and the precious metals. In addition to the employment furnished by these minerals, the inhabitants, who are very industrious, have with considerable success superadded textile manufactures. It is now indeed the chief manufacturing district in Germany, and the most densely peopled. It contains the busy towns of Elberfeld, Barmen, &c. The duchy of Berg, founded in 1389, had been long consolidated with the Prussian dominions when (1806) Napoleon revived the title, and conferred it, with an enlarged territory, on Murat. On Murat's receiving the kingdom of Naples, Napoleon named his nephew Louis Napoleon (brother of the late Emperor Napoleon III.) here-

ditary Grand-duke of Berg, and increased its limits still farther. At the Congress of Vienna, in 1815, the whole was given to the King of Prussia.

BERGA, a town, Spain, Catalonia, in the province of Barcelona, 18 miles N.E. from Solsona, near the river Lobregat. Its streets are paved, but for the most part narrow and crooked. It has a townhouse, an hospital, theatre, several fountains, and a castle with a strong battery, by which the town is overlooked and defended. The manufacture of cottons is carried on, but the bulk of the inhabitants are employed in husbandry and as muleteers, by which conveyance the produce of the vicinity, grain, wine, oil, fruits, &c., are exported. Two annual fairs are held. Pop. 6999.

BERGAMA, a town of Turkey in Asia, in the pashalic of Anatolia, on the right bank of the Grimaldi or Caïcus, 42 miles N.N.E. Smyrna. It occupies the site of the ancient Pergamus (which see), and contains numerous remains attesting its ancient magnificence. In the centre is an extensive ruin, supposed to have been the palace of a Roman emperor. Numerous khans and mosques—among the latter, one which from its style appears to have been an early Christian church—occupy the site of ancient buildings. Triumphal arches and ruined houses are interspersed with Turkish hovels. To the S.W. of the castle are the remains of the amphitheatre, with arches of fine workmanship, though now almost under ground. The cemeteries are full of beautiful relics. Pop. about 10,000.

BERGAMO, capital of the province of Bergamo (1023 Eng. square miles, and 368,141 inhabitants), in the Kingdom of Italy, Lombardy, is situated on hills between the rivers Brembo and Serio, has a castle within the city, and another, called *La Capella*, without it, besides two suburbs encircled by walls, and four others that are open, containing together 37,363 inhabitants. Amongst many distinguished men born here was the famous Tiraboschi, the historian of Italian literature. Bergamo exported formerly more than 1200 bales of silk, and still trades largely in silk, silk goods, corn, &c. At its fair goods to the value of a million sterling have sometimes been sold. In 1428 the Bergamese put themselves under the Republic of Venice. In 1796 Bonaparte took Bergamo, and it was subsequently made the capital of the department of the Serio, in the Kingdom of Italy. It has an academy of painting and sculpture, a museum, an athenæum, a public library, several academies, many manufactories, especially of silk. There is also a small Protestant congregation in this city. The comic characters, Arlechino or Truffaldino, and Brighella, in the Italian masked comedy, are Bergamese, or affect the dialect of the country people in the neighbourhood of this city.

BERGAMOT, a kind of fruit generally regarded as a variety of the orange, though some consider it a distinct species. The bergamot is cultivated in the S. of Europe, into which it is believed to have been introduced from the East. The fruit is pear-shaped and pale yellow in colour, with a fragrant and slightly acid pulp. Its essential oil is in high esteem as a perfume.—*Bergamot* is also a name given to a number of different pears.

BERGEN, a seaport on the W. coast of Norway, capital of a province or diocese of the same name, formerly the principal town of the kingdom, but now the second. It is 186 miles N.W. of Christiania, and about 25 from the open sea, situated on the W. side of a peninsula and on a bay of the Byfiord, which stretches into the country, and forms a safe harbour, surrounded by high and steep rocks. The entrance, however, is dangerous. Rocky hills from 800 to 2000 feet high encircle the town on the land side; on the sea side it is defended by an old fortress, citadels, batteries, &c. The climate is comparatively mild, on account of the sheltered situation of the town; and is remarkable for frequent rains. The town is well built, yet several streets are crooked and uneven, on account of the rocks. It contains 30,252 inhabitants, a museum, one German and four Danish churches, a cathedral and a classical school, a seminary, founded by Bishop Pontoppidan, for twelve students, who are instructed gratis in the higher branches of literature; a naval academy, an hospital for such as are infected with the scurvy, which is common among the fishermen, arising from their food, principally smoked or salt meat and fish; besides other useful institutions. The inhabitants of the middle coast of Norway bring their boards, masts, laths, firewood, tar, train-oil, hides, &c., and particularly dried fish (stock-fish), to Bergen, to exchange them for corn and other necessaries brought thither by the British, Dutch, and Germans. Bergen exports annually about 500,000 barrels of salted herrings, with 20,000 barrels of cod-oil. In the year 1445 a factory and several warehouses were established here by the Hanseatic cities of Germany, and the *German traders*, as they called themselves, enjoyed for some time the protection of the Hanseatic league. The German factory consisted of about sixty warehouses. The roads leading into the interior of the country are frequented only in the winter, when they are passable in sleds. Bergen is the native place of the poet Holberg.

BERGEN is also the name of other places, amongst which may be mentioned the capital of the Prussian island of Rügen, in the Baltic, a small town of 3536 inhabitants; and another small place in the Prussian province of Hesse-Nassau, where a bloody battle was fought between the French and allies in the Seven Years' war, in which the former were victorious (April 13, 1759).

BERGEN-OP-ZOOM, a town, Holland, in a marshy situation on the Scheldt, 20 miles N.N.W. of Antwerp. It is of great strength, both by nature and art, the morasses which surround it making it almost inaccessible to an assailing force, while its fortifications consist of regular works, constructed by the celebrated Coehorn. It is well built, but has no edifices deserving of particular notice. It made an important figure during the Spanish war, and successfully resisted the attacks of the Duke of Parma in 1581 and 1588, and of Spinola in 1622. It was taken by the French in 1747 and 1794, and unsuccessfully attempted by the British under Sir Thomas Graham, afterwards Lord Lynedoch, in 1814. Its trade has suffered greatly from the proximity of Antwerp. Pop. 9139.

BERGERAC, a town of France, in the department of the Dordogne, 48 miles E. of Bordeaux, which gives the name to an agreeable wine cultivated on the banks of the Dordogne. There is a white and a red sort. In France it is sometimes also called *petit Champagne*. Pop. (commune), 12,224.

BERGHEM, NICHOLAS, an eminent painter, was born at Harlem in 1624, and received his first instruction in painting from his father, Peter of Harlem, who was a very indifferent artist. He then continued his studies under Van Goyen and the elder Weenix. Love of his art, and the great demand for his paintings, as likewise the avarice of his wife, prompted him to labour with extreme assiduity. To buy engravings, of which he was very fond, he was often compelled to borrow money from his students, which he could only refund by deceiving his wife in regard to the price of his paintings. In this manner he obtained a rich collection. Berghem's landscapes and representations of animals adorn the most cele-

brated galleries. The distinguishing characters of the pictures of Berghem are the breadth and just distribution of the lights, the grandeur of his masses of light and shadow, the natural ease and simplicity in the attitudes of his figures, the brilliancy and harmony as well as transparency of his colouring, the correctness and true perspective of his design, and the elegance of his composition. Although he hardly ever left his workshop, yet he had closely observed nature during a long residence in the palace of Benthem. He died at Harlem, 1683. Charles Dujardin and Glauber were among his pupils.

BERGMAN, Torbern Olof, a natural philosopher and chemist, was born at Catharineberg, in the Swedish province of West Gothland, March 20, 1735, and obtained after many difficulties the permission of his family to devote himself entirely to the sciences. At that time disciples flocked from all quarters to Linnæus at Upsal. They were joined by Bergman in 1752, who by his acuteness and his discoveries in natural history, especially in entomology and botany, excited the notice of this great man. In 1758 he became Doctor of Philosophy and professor of physics at Upsal. Upon the resignation of the celebrated Wallerius, Bergman was a candidate for the professorship of chemistry and mineralogy. His competitors charged him with ignorance of the subject, because he had never written on it. To refute them he shut himself up for some time in a laboratory, and prepared a treatise on the manufacture of alum, which is still considered as a standard work. In 1767 he became professor of chemistry, and devoted himself with ardour to this science. He invented the preparation of artificial mineral waters, and discovered the sulphuretted hydrogen gas of mineral springs. We are indebted to him for a knowledge of the characters which distinguish nickel from other metals. On a number of minerals he made chemical experiments, with an accuracy before uncommon. He published a classification of minerals, in which the chief divisions are based on their chemical character, and the subdivisions on their external form. In preparing this work he was much aided by his former discovery of the geometrical relations between different crystals of the same substance, which may be deduced from one primitive form, and are produced by the aggregation of similar particles, according to fixed and obvious laws. His theory of the chemical relations is still esteemed, and if it has received some new developments from the further researches of Berthollet, it has not been overthrown. The order of Gustavus Vasa was bestowed on Bergman. He declined the invitation of Frederick the Great to remove to Berlin. He died exhausted by his exertions in 1784, in the forty-ninth year of his age. Among his works the first place is due to Opuscula Physica, Chemica, et Mineralia (Stockholm, 1779–94, six vols.), of which an English translation appeared.

BERGUES, a town, France, in the department of Nord, in a marshy district, at the junction of the Bergues, Dunkirk, and Colme canals, 5 miles S. of Dunkirk, with 5738 inhabitants. It ranks as a fortress of the first class, is well built of brick, and having a basin which admits vessels of 250 tons, is the centre of a considerable trade. Its principal edifices are the townhouse, and a beautiful and richly ornamented belfry above 160 feet high. It owes its origin to the castle of Berg, to which St. Winnoc retired in 902, was first fortified by Baldwin II., count of Flanders, afterwards adorned with a magnificent monastery of St. Winnoc by Baldwin IV., and in the thirteenth century possessed flourishing manufactures. It makes an important figure, and often suffered dreadfully during the wars in the Low Countries.

BERKELEY, a market town, England, 16 miles S.W. of Gloucester, pleasantly situated on the right bank of the Avon, in the rich vale of Berkeley, and celebrated for its castle, where Edward II. was confined and barbarously murdered.

BERKELEY, Dr. George, Bishop of Cloyne in Ireland, celebrated for his ideal theory. He maintains that the belief in the existence of an exterior material world is false and inconsistent with itself; that those things which are called *sensible material objects* are not external but exist in the mind, and are merely impressions made on our minds by the immediate act of God, according to certain rules termed *laws of nature*, from which he never deviates; and that the steady adherence of the Supreme Spirit to these rules is what constitutes the reality of things to his creatures; and so effectually distinguishes the ideas perceived by sense from such as are the work of the mind itself or of dreams, that there is no more danger of confounding them together on this hypothesis than on that of the existence of matter. He was born at Kilcrin, Ireland, in 1684; became fellow of Trinity College, Dublin, in 1707; travelled in Italy as far as Leghorn in 1713 and 1714, and at a later period accompanied Mr. Ashe, son of the Bishop of Clogher, on a tour through Italy, Sicily, and France. In 1721 he was appointed chaplain to the Lord-lieutenant of Ireland, the Duke of Grafton. He appeared with much applause as an author before he was twenty years old. His works on philosophy and mathematics (among which his Theory of Vision, published in 1709, is the most brilliant proof of the author's acuteness) procured him a wide-spread fame. By a legacy of Mrs. Vanhomrigh, the celebrated Vanessa, who has become so generally known through her love to Swift, his fortune was considerably increased. In 1724 he was promoted to the deanery of Derry and resigned his fellowship. He now published his Proposals for the Conversion of the American Savages to Christianity by the Establishment of a College in the Bermuda Islands. The project was very favourably received, and persons of the first rank raised considerable sums by subscription to aid it; and Berkeley having resigned his preferment set sail for Rhode Island, with several other persons of similar views, to make arrangements for carrying on his college. The assistance of Parliament, which had been promised, not being afforded, his undertaking miscarried, after he had spent seven years and a considerable part of his fortune in his efforts to accomplish it. He afterward wrote numerous philosophical, religious, and politico-economical works. Towards his sixtieth year he was attacked by a nervous colic, which he attempted to cure by the use of tar-water, whereby he was induced to publish two treatises on the utility of this water. He died suddenly at Oxford in 1753. Berkeley is said to have been acquainted with almost all branches of human knowledge. His character commanded the respect and love of all who knew him. Pope, his constant friend, describes him as possessed of 'every virtue under heaven.' His most celebrated philosophical works are—a Treatise on the Principles of Human Knowledge (London, 1710); Three Dialogues between Hylas and Philonous (London, 1713); Alciphron, or the Minute Philosopher (London, 1732). His works appeared in London, 1784, two vols. 4to, preceded by a biography written by Arbuthnot. A new edition of his works, in three vols. 8vo, by Professor Fraser of Edinburgh, was published in 1871, together with his Life and Letters in one vol.

BERKENHOUT, John, a Dutch-English physician and general writer, born at Leeds about 1780. Having entered the Prussian service, he rose to the rank of captain. In 1756 he quited that service and

entered into that of England, where he obtained the same rank. At the peace in 1760 he went to Edinburgh and began the study of physic; while there he published his Clavis Anglica Linguæ Botanicæ, a book of great merit; in 1765 he went to Leyden, and took his degree of M.D. On his return to England he settled at Isleworth, in Middlesex, and soon after published his Pharmacopœia Medici, which passed through three editions. In 1778 he attended the British commissioners to America, and at Philadelphia he was committed to prison, but he soon afterwards was set at liberty, and returned with the commissioners to England, where he obtained a pension. He died in 1791, aged sixty. Dr. Berkenhout was an industrious writer, and his publications possess considerable meri[illegible]

BERKHAMPSTEAD, GREAT, a town and parish in England, Hertfordshire. The town is beautifully situated in a hollow, surrounded by hills, on the main road leading from London to Aylesbury; W. side of the Bulbourn Stream, and the Grand Junction Canal; on the line of the London and North-Western Railway; 26 miles N.W. of London. It consists almost wholly of one main street, and has a fine old church, several Dissenting chapels, and various schools and charitable associations. Straw-plaiting is largely carried on, and all the army tent pegs are made here. Pop. in 1871, 4083.

BERKHEY, JOHANNES LEFRANCA VAN, one of the most eminent Dutch writers of the eighteenth century, was born at Leyden in 1729, and died there in 1812. His work entitled Naturlyke Historie van Holland first brought him into notice, and procured him the appointment of lecturer on natural history to the Leyden Academy. He has also distinguished himself as a poet, though he often manifests a tendency to bombast, and indulges in false pathos. One of his best poems, entitled Het Verheerligkt Leyden, was composed to celebrate the second centenary of his native town, and was publicly read by himself at the great festival held on the occasion in the hospital church in 1774. A great explosion of gunpowder in 1807 destroyed his house and means.

BERKSHIRE, a county of England, bounded on the N. by Oxfordshire and Buckinghamshire, from which it is separated by the Thames; on the E. by Surrey; on the S. by Hampshire; and on the W. by Wilts. It also touches the county of Gloucester on the N.W. Its shape, partly owing to the windings of the Thames, is very irregular, and has been compared to that of a shoe or slipper. The western and central parts are deemed the most fertile, the east being principally occupied by Windsor Forest and its appendages, together with a considerable portion of uninclosed and uncultivated land. A range of chalk hills, entering from Oxfordshire, crosses the county in a westerly direction, and forms a boundary to the fertile vale of Whitehorse, so called from the gigantic form of a horse which has been scooped out of the side of a chalk hill, so as to become conspicuous to all the country round. The cultivated parts of the county, and more especially this vale, are peculiarly fruitful in barley. They also contain much rich pasturage and many excellent dairy farms. Timber abounds, particularly oak and beech, in Windsor Forest and towards the west. Owing to the extent of the forest above mentioned, as also of Maidenhead Thicket, Tylehurst Heath, and the numerous commons in all directions, a very considerable part of the county is unproductive of anything but wood, wild fowl, and game. No minerals of consequence have yet been found. The rivers of Berkshire are the Thames, the Kennet, the Lambourn, the Ock, and the Lodden. The Thames enters the county about a mile south of Lechlade, and waters in its course the towns of Abingdon, Wallingford, Reading, Henley, Maidenhead, and Windsor, to the great advantage of the trade of the whole of them, by forming so fine a water communication with the great mart of the metropolis. The Kennet enters near Hungerford, and passing Newbury, flows into the Thames at Reading. The Lambourn rises near that town, and falls into the Kennet below Newbury. The Ock rises in the vale of Whitehorse, and falls into the Thames near Abingdon, as does the Lodden near Wargrave. Besides the magnificent castle of Windsor, and other royal residences in that vicinity, the county contains nearly 150 seats of noblemen and gentry. There are but few manufactures carried on in this county, the principal being those of woollens, paper, and sail-cloth. Malt is made in great quantities, and chiefly sent to London. Hogs are reared in great numbers. Many of the peasantry in some parts of the county derive employment from digging peat for fuel, the ashes from which form excellent manure. The principal towns of Berkshire are Reading, Newbury, Maidenhead, Wokingham, Wallingford, Windsor, Abingdon, Wantage, and Farringdon. Berkshire returns nine members to the House of Commons; three for the county, two each for Reading and Windsor, and one each for Abingdon and Wallingford. Area of county, 705 square miles; pop. in 1861, 176,256; in 1871, 196,445.

BERLICHINGEN, GÖTZ or GODFREY VON, with the Iron Hand; born at Jaxthausen, in Suabia; a bold, restless, warlike, and honourable German knight of the sixteenth century. He placed himself at the head of the rebellious peasants, in the war which they waged against their oppressors (see PEASANT WAR in Germany), but was soon made prisoner. Before that time he had lost his right hand, and therefore wore one made of iron. He died July 23, 1562. His biography, written by himself, was printed at Nuremberg in 1731 and 1775, and, for the third time, at Breslau in 1813. This book contains an excellent picture of the social life and customs of the time, and has furnished Goethe with the subject for his drama, Goetz von Berlichingen, translated by Sir Walter Scott.

BERLIN (anciently *Berle*—uncultivated land), the capital of the Prussian dominions and of the German Empire, the residence of the Emperor of Germany and foreign ambassadors, province of Brandenburg; lat. (new observatory) 52° 30′ 16″ N.; lon. 13° 23′ 53″ E.; the largest town in Germany, and, for the beauty and size of its buildings, the regularity of its streets, the importance of its institutions of science and art, and its activity, industry, and trade, one of the first cities in Europe. It is situated on a dreary sandy plain, about 126 feet above the level of the sea, on both sides of the Spree, a sluggish stream, here about 200 feet broad, which winds through the city from S.E. to N.W., and near its centre forms an island by the division of its channel. It is surrounded with a wall 16 feet high and 12 miles in circumference, having nineteen gates besides minor outlets. It has water communication to the North Sea by the Spree, which flows into the Elbe, and to the Baltic by canals connecting with the Oder. The city is at present divided into the following twelve quarters:—(1) Kölln, on the south of the Spree, divided into Old and New Kölln; (2) Old Berlin proper, between the Spree and Königsgraben; (3) The Luisenstadt, consisting of the old Köpeniker suburb in the south-east; (4) Friedrichstadt, in the south-west; (5) Friedrichswerder, between Kölln and Friedrichstadt; (6) The Dorotheenstadt, between Friedrichstadt and the Spree, which bounds it on the north; (7) Friedrich-Wilhelm-Stadt, lying north from the preceding, and on the right bank of the Spree; (8) The Stralauer

quarter; (9) The Königstadt; (10) The Spandauer quarter; (11) The Oranienburg-Rosenthal suburb (Wedding and Voigtland); (12) The New Precinct (with Moabit, the Schönberger Strasse, &c.) The original portion of the city lies on the right bank of the river, and is very irregularly built, consisting for the most part of narrow crooked streets and very indifferent houses. The more recent portion rose up, as if by magic, at the orders of Frederick the Great; who, having previously adopted a plan subdividing the intended site by straight and spacious streets, partly parallel and partly at right angles to each other, caused them to be lined by handsome houses of uniform appearance, and, for the purpose of occupying a larger space, of only two stories in height. For a long time part of the space within the walls was unoccupied; the whole is now covered with buildings, and there are considerable suburbs outside the walls. The houses are built of white freestone, or brick covered with a coating of plaster or cement. The drainage of the city, however, owing to the flatness of the ground on which it stands, and to the sluggishness of the Spree, is so bad that, in hot weather, the most offensive odours pollute the air and render it unhealthy. The streets are now well paved and well lighted with gas, and many of them are lined with lofty and elegant buildings. Hackney-coaches and other street conveyances are numerous, and under excellent surveillance. The houses generally are heated with stoves. Of the numerous bridges, the finest is the Castle Bridge, very spacious, being 104 feet wide, and having its eight piers surmounted by colossal groups of sculpture in marble. The city has many fine churches and several synagogues; ten theatres; about thirty hospitals, &c., public and private; sixteen barracks; ten or twelve cemeteries, mostly without the walls. Its principal and most frequented street, the Unter den Linden, is in some respects unsurpassed. It is situated in the new portion of the city, and traverses it from E. to W. It is above a mile in length, and of remarkable width, the centre being occupied by a double avenue of lime-trees, which give it its name and form a fine shady promenade; while on either side of the trees is a carriage-way, and beyond each carriage-way, in front of the houses, a spacious foot-pavement. At the E. end of this street, and in the Lustgarten, with which it is connected by the bridge already mentioned, are clustered the principal public buildings of the city, and diverging from it are several fine squares; while at the W. end it terminates magnificently with the Brandenburg Gate, a noble structure, modelled on a grand scale after the Propylæum of Athens, and regarded as one of the finest portals in existence. The gateway is surmounted by a colossal Victory in bronze, mounted in a car drawn by four horses. Outside the walls, immediately beyond this portal, is the Thiergarten, an extensive and well-wooded park, interspersed with ponds, shrubberies, and trees, and containing the palace of Bellevue, as well as elegant villas and places of public amusement.

The principal public buildings are the royal castle or Schloss, a vast rectangular pile, more remarkable for a certain air of grandeur than architectural beauty. It is sumptuously furnished, and contains a large and richly decorated chapel, first opened in 1853, whose lofty dome forms the most striking external feature of the building. On the opposite side of the garden, in front of the Schloss, is the museum, a fine building in pure Grecian taste, with its extensive collection of sculpture and painting; and behind it the new museum, containing extensive collections of Egyptian and other antiquities, and also the celebrated mural paintings by Kaulbach. The royal theatre, in the Gensdarmenmarkt, is a fine Grecian edifice, one of the most important works of the eminent architect Schinkel. The royal library and palace of King William I. are united; the former contains above 700,000 volumes and 15,500 manuscripts and charts. The arsenal (Zeughaus) contains heavy artillery, about 150,000 stand of arms, together with flags and other trophies, many of them of great antiquity. The palace of Prince Albert, the university, the new exchange, the Italian opera-house, the principal Jewish synagogue, the town-hall, and the architectural academy, are all beautiful structures. The prevailing style of the newer buildings, both public and private, is Grecian, or an Italianized adaptation of that style. One of the most remarkable of modern monuments, is that erected in 1851 to Frederick the Great in the Unter den Linden—the *chef d'œuvre* of Rauch and his pupils. The colossal statue of the king on horseback is placed on a lofty pedestal, around which are grouped bronze figures representing his principal generals, ministers, and eminent men of his time—in all thirty-one portrait statues the size of life, those at the four corners being on horseback. In front of the arsenal are statues in bronze of Blücher, and of Generals York and Gneisen—the former by Rauch, and the two latter by Freibel. Two marble statues by Rauch—one of Bülow and another of Scharnhorst—and an equestrian statue in bronze of the great elector, Frederick William, are well deserving of notice. The literary institutions of the city are numerous and respectable; they include the university, attended by 2000 students in summer and 2300 in winter, exclusive of 1200 to 1400 who do not matriculate, and numbering among its professors many names of European reputation; the academy of sciences; the gymnasia or high-schools, of which there are eight, with a number of less celebrated academies; an institution for instructing the deaf and dumb, an academy of fine arts, the *Gewerbe-Schule*, or artisan school, where promising young artisans are taught drawing, modelling, &c., gratuitously.

Berlin is the literary and scientific metropolis of Germany, and, in the various walks of literature, philosophy, science, and art, can show a galaxy of names such as few cities can equal. Since the time of Frederick the Great it has been the policy of the Prussian kings to attract to their capital, either through professorships in the university or otherwise, learned men in every department of knowledge. Consequently, though but a city almost of yesterday, the number of eminent men who have laboured, or who still labour, within the walls of Berlin is very great. Of those who are world-renowned may be named Leibnitz, who founded the Academy of Sciences in 1700, and became its first president; the pious Spener; the historian Puffendorf; the philosophers Fichte, Schleiermacher, F. A. Wolf, and Hegel; the theologians Neander, De Wette, and Hengstenberg; the historians Ranké and Von Raumer; the geographers Ritter and Leipsius; the linguists Bopp, Zumpt, the brothers Grimm; and many others. In the natural sciences the unrivalled Alexander von Humboldt; and after him are many brilliant names, as Poggendorf, Ermann, Mitscherlich, Rose, Erichson, Ehrenberg, Link, and Von Buch. Many others might be mentioned; but it may suffice, further, to name the poets Tieck and Rückert, the famous sculptors Rauch and Schadow, and the composers Felix Mendelssohn and Meyerbeer.

The charitable institutions include the hospital of charity, the royal institution for providing for widows, the hospital for invalids, the hospital of St. Dorothy, the new royal hospital, &c., with a great number besides for all kinds of benevolent purposes.

The manufactures of Berlin are various and exten-

sive. For silks and cotton goods, carpets, and other woollen goods, it is the first place in Germany; shawls, fringes, hosiery, &c., are also largely made. The manufactures of tobacco, chemicals, leather and leather goods, mirrors, cast-iron, tin and lackered wares, furniture, carriages, china and stone ware, are important, as are also the gold, silver, and bronze wares, the works in plaster and marble, &c. Machines are made on a great scale; the establishment of Borsig alone employs nearly 3000 hands. In the royal iron-foundry busts, statues, bass-reliefs, &c., are cast, together with a great variety of ornaments of unrivalled delicacy of workmanship. The society of the upper classes of Berlin is difficult of access, and their hospitality limited. Music is here extensively and successfully cultivated. The performance of sacred vocal music, in particular, has attained extraordinary perfection. The opera and theatres are on the most respectable footing, and are liberally encouraged, the taste for such entertainments pervading all classes.

Railways.—Berlin is well supplied with railways. It communicates W. direct with Hamburg; N. with Stettin; E. with Cracow, Warsaw, and Austria; S. with Leipzig and Dresden, &c.

History.—The oldest parts of the city are Kölln and Berlin proper, which were originally poor villages inhabited by fishermen, and first rose to some importance under Markgraf Albert (1206–20), the grandson of Albert the Bear. The Elector Frederick II. with the Iron Teeth built a castle at Kölln on the banks of the Spree in 1442; and from the time of John Cicero the town became the permanent residence of the electors. About two centuries ago Berlin was still a place of little importance. It was confined to the immediate bank of the Spree and the island which divides its channel, and consisted of a series of villages, which have gradually merged into each other, and now form its different quarters. The first important improvement was made by the great elector Frederick William, who planted the Unter den Linden, and otherwise enlarged and beautified the town; so that in his time it already numbered 20,000 inhabitants. He may be considered as the second founder of the city. His successor, King Frederick I., seconded his efforts; but Berlin never assumed the appearance of a capital till the time of Frederick the Great, who, determined to make it worthy of his extended dominions, inclosed a large space within the walls, and proceeded to build upon it, to supply the wants, not so much of actual, as of an anticipated population. He was twice interrupted in the work, and almost driven from his purpose, when in 1757 the city fell into the hands of the Austrians, and in 1760 into those of the Austrians and Russians. But he soon repaired the damage; and his successors having followed ardently in his steps, Berlin has rapidly risen to be the first city in Germany in respect of population, and also the first in respect of architectural grandeur and political influence. Pop. in 1846, 408,502; in 1871, 825,389, of whom about nine-tenths were Protestants.

BERMUDAS ISLANDS, or Somers Islands, a cluster of small islands in the Atlantic Ocean. They are in number about 400, but for the most part so small and so barren that they have neither inhabitants nor name. They were first discovered by Juan Bermudez, a Spaniard, in 1522; in 1609 Sir George Somers, an Englishman, was wrecked here, and, after his shipwreck, formed the first settlement. The most considerable of these islands are St. George, Bermuda or Long Island (with the chief town Hamilton, strongly fortified, and forming the seat of the governor), Somerset, St. David's, and Ireland. They are situated about 580 miles S.S.E. of Cape Hatteras in North Carolina, and are a naval and military station of Great Britain. They are also a convict station, the convicts being employed on public works, such as the fortifications and the harbour works on Ireland Island. The military head-quarters are on St. George's. An immense iron floating-dock was constructed at London for the Bermudas in 1868; it is capable of receiving a vessel of 3000 tons.

The climate of these islands is generally healthy and delightful; but they are sometimes visited by yellow fever. The winter is hardly perceptible; a perpetual spring may be said to reign; the trees never lose their verdure, and the leaves only fall when new ones begin to appear. Birds sing and breed without intermission. But these advantages are counterbalanced by frightful storms, accompanied by formidable thunder. The surface is rather irregular; the soil, though light and stony, is in general rich and fertile. The water is in general salt; there is but little fresh except rain water, preserved in cisterns. The inhabitants gather two harvests of Indian corn in a year—one in July, and the other in December: this forms their principal food. They likewise cultivate and export potatoes, arrowroot, onions, &c. Their trees are principally the cedar and palmetto. Besides these, they have orange trees, olive, laurel, pear-trees, &c. There are no venomous reptiles. Pop. about 12,000, white, coloured, and black.

BERN, the chief canton of Switzerland, 2660 square miles, 506,465 inhabitants (among whom the vast majority are Calvinists), with a capital of the same name. Kuno von Bubenberg, in the twelfth century, inclosed the small place Bern, in the vicinity of the fortress of Nydeck, with a moat and walls, and the Duke of Zähringen, to whom Nydeck belonged, gave the new city laws. Its population was much increased in the thirteenth century. The lower nobility of the adjacent country fled to it for protection against the oppressions of the higher, and were joined by the country people, and particularly by the citizens of Friburg and Zurich. The Emperor Frederick II. declared it a free city of the empire in 1218, and confirmed its privileges by a charter, which is still preserved in the archives. In 1288 Bern was besieged by Rodolph of Hapsburg, but not taken; and in 1291 the citizens of Bern, under Ulrich von Bubenberg, made war against their own nobility, commanded by Ulrich von Erlach. Bern now became an asylum for all those who suffered under the oppression of the nobles of Austria, and rose to a height of power that excited the envy of other cities as well as of its own nobility. The latter therefore entered into an alliance with the hostile cities for the purpose of destroying it. Their army, consisting of 18,000 men, headed by 700 of the higher nobility, with 1200 knights, was totally vanquished at Laupen, June 21, 1339, by the citizens of Bern, led by Rodolph von Erlach, though these were only one-third of their number. After this victory the city continued to increase, and in 1353 entered into the perpetual league of the Helvetic Confederacy, in which it held a rank inferior only to Zurich. Until the close of that century Bern enlarged its dominions, partly by purchase and partly by conquest. In 1405 the greater part of the city was destroyed by fire, but was afterwards regularly rebuilt. The long wars with Austria, Milan, Burgundy, and Savoy soon after broke out, from all which the Confederacy came off victorious, and in which Bern conquered Aargau. In 1528 the citizens of Bern embraced the cause of the Reformation. In the subsequent war with the Duke of Savoy they conquered the Pays de Vaud. The countries gained by conquest were governed by bailiffs, who resided in mountain castles. From that time to March 5,

1798, the prosperity and wealth of Bern was constantly increasing, as may be clearly perceived from the large sums spent for the public administration. At that time the canton contained above 5000 square miles, and about 380,000 inhabitants. Upon the day above mentioned 30,000 French troops marched against Bern. It was again an Erlach who led 18,000 citizens of Bern, together with 8000 auxiliary troops of the confederate cantons, into the field; but the memory of Morgarten, of Laupen, and Murten no longer inspired them to victory: the troops of the confederates, on their retreat, slew their own commander. Bern for the first time opened its gates to an enemy, and lost about half of its possessions. The northern part was united with the present canton of Aargau, and out of the south-western (Pays de Vaud) the present canton of Vaud was formed. By the decrees of the congress at Vienna, however, the greater part of the bishopric of Basel was joined to the canton; and according to the new aristocratic constitution of the canton, the sovereign power is exercised by a bailiff, and the great and lesser councils of the city and republic of Bern, consisting of 200 members chosen from the city of Bern, and ninety-nine from the towns and the country. The former are chosen from the citizens over twenty-nine years old, by an elective assembly composed of the members of the lesser council, and a committee of the great. The ninety-nine members from the towns and country are chosen partly from the towns by the municipal authorities, partly from each of the twenty-two districts into which the country is divided, by elective assemblies, and partly by the great council. Two bailiffs preside in turn, each for the space of a year, in the great and lesser councils. The former has the legislative, the latter the executive power. In 1870 the *referendum* was introduced into Bern, according to which no laws have force until they have been approved by a vote of the people after having been discussed by the greater council.

The northern part of the canton is hilly, with beautiful plains and valleys, and has a fertile and highly-cultivated soil, producing corn, wine and fruits. Here is situated Emmenthal, one of the richest and most fertile valleys in Switzerland, where the finest cattle are raised, and the well-known Emmenthal cheese made. Neat houses, comfortable dresses, and cheerfulness indicate the prosperity of the inhabitants of this valley. The southern part of the canton, the Oberland (Upperland), (to which the valleys of Hasli, Grindelvald, Lauterbrun, Cander, Frutingen, Adelboden, Simmen, and Saanen, with numerous smaller valleys, belong), begins at the foot of the high mountain chain towards the Valais, and extends to its summit. The lower valleys produce good fruits, and are fertile and agreeable: higher up are excellent Alpine pastures; then succeed bare rocks, extensive glaciers (the source of magnificent waterfalls), and the highest mountains of Switzerland, as the Finsteraarhorn, the Shreckhorn, and Wetterhorn, the Eiger, the Jungfrau. The inhabitants of the Oberland live principally by raising cattle.—The chief trade is in linen and woollen manufactures, especially in Emmenthal. The revenues of the state amount to about 5,700,000 francs, or £228,000 sterling. The canton furnishes 5824 men to the army of the Confederacy, and contributes 104,080 Swiss francs to its support.

BERN (36,000 inhabitants), the capital, one of the best-built cities in Switzerland, is situated upon the declivity of a hill, on a peninsula, washed on three sides by the Aar. The streets are, for the greater part, straight, wide, and well paved, and the houses, partly provided with piazzas, are substantially built of stone. The streets are purified by rills of water, and adorned with fountains. Among the public buildings are the great Gothic cathedral, built between 1421 and 1502, with a spire 190 feet high; the church of the Holy Spirit; the university, with a full equipment of professors in all the different faculties and arts; the handsomely built hospital, the townhouse, a Gothic edifice of the fifteenth century; the mint, where money is coined for several cantons; the corn market and corn magazine, for storing grain in case of scarcity; the observatory, the deaf and dumb institution, the infirmary, the orphan and lunatic asylums. Bern has an academy and several literary societies. The gallery for native specimens of natural history, founded in 1802, contains viviparous animals, birds, butterflies, insects, and plants. The public library possesses great treasures, both of printed books and manuscripts. Several private persons have museums, which are generally open to strangers. Trade and commerce are lively; the manufactures consist of woollen cloth, printed linens, silk stuffs, stockings, &c. There are few cities with finer promenades, or where they are kept in better repair. One of the favourite walks, for instance, is near the cathedral, raised at great expense, and planted with four rows of trees. The side towards the Aar is 108 feet above the river, which here forms a beautiful cascade, equalling that of the Rhine at Lauffen.

BERNADOTTE, JEAN-BAPTISTE-JULES, a French general, afterwards raised to the Swedish throne, was the son of an advocate of Pau, in the province of Bearn, and born there on 26th January, 1764. His father's profession having few attractions for him, he enlisted at the age of seventeen, in a regiment of marines, and accompanied it to Corsica. His progress was at first slow, he having only attained the rank of a sergeant-major in 1789, but after 1790, when he was made a subaltern, his promotion was rapid. In 1794 he was appointed a general of division, and distinguished himself greatly in the campaign in Germany, and on the Rhine. After the battle of Neuwied he was introduced for the first time to Bonaparte, who conceived the highest opinion of his abilities, though a constant suspicion of Napoleon and his projects seems always to have been present in the mind of Bernadotte. In 1798 he married Mademoiselle Clary, daughter of a Marseilles merchant, and sister-in-law of Joseph Bonaparte. The following year he became minister of war, but from a strong opposition against him, was shortly obliged to resign office. On the establishment of the empire, Bernadotte was raised to the dignity of marshal of France, and the title of Prince of Ponte-Corvo. Being now placed at the head of an army of observation stationed in the N. of Germany, he fixed his head-quarters at Hamburg. At this time Gustavus IV. had been driven from the throne of Sweden. The Duke of Sudermania assumed the reins of government under the name of Charles XIII.; and as he was far advanced in years, the diet had nominated, as his successor, the Prince of Holstein-Augustenburg, when the latter died in a mysterious manner. The heir-apparency to the Swedish crown was then offered to the Prince of Ponte-Corvo. This offer was accepted by Bernadotte, with the consent of the emperor; and in October, 1810, he arrived in Sweden, where, having previously abjured the Roman Catholic religion, he was proclaimed heir-apparent to the throne, under the title of Prince Charles John. He had not long been established in this dignity before serious disagreements took place between him and Bonaparte, whose blockade of the continental ports was very detrimental to the commercial interests of Sweden.

The result was a complete rupture, and the accession of Sweden in 1812 to the coalition of sovereigns formed against Napoleon. At the battle of Leipzig the abilities of Prince Charles John, with his army of Swedes, contributed effectually to the victory of the allies. On the general re-establishment of European dynasties at the termination of the war, strenuous attempts were made by the Emperor of Austria and other sovereigns to restore the family of Gustavus IV. to the crown, but all proved ineffectual; and Bernadotte, retaining his position as crown-prince, became King of Sweden on the death of Charles XIII. in 1818, under the title of Charles XIV. During his reign agriculture and commerce made great advances, and many important public works were completed; among others, the great road across the mountains to Norway, and the Gotha Canal, uniting the Baltic with the North Sea. He died of apoplexy on 8th March, 1844, and was succeeded by his son Oscar.

BERNARD, GREAT ST., a celebrated pass of the Pennine Alps, canton Valais, on the mountain-road leading from Martigny in Switzerland to Aosta in Piedmont; lat. 45° 51′ N.; lon. 7° 11′ 23″ E. On the E. side of the pass is Mount Velan, and on the W. the Pointe de Dronaz; there is no *mountain* known by the name of St. Bernard. Almost on the very crest of the pass is the famous Hospice, supposed to be the highest inhabited spot in Europe, 8200 feet above the level of the sea. It is a massive stone building, capable of accommodating seventy or eighty travellers with beds, and of sheltering 300. As many as 500 or 600 have received assistance in one day. It is situated on the highest point of the pass, exposed to tremendous storms from the N.E. and S.W., and is tenanted by ten or twelve brethren of the order of St. Augustine, who have devoted themselves by vow to the aid of travellers crossing the mountains. The climate of this high region is necessarily rigorous. There is a lake on the summit, at a short distance from the Hospice, on which ice has frequently remained throughout the whole year. The severest cold recorded is 29° below zero, Fah., but it has often been 18° and 20° below zero; the greatest summer heat recorded is 68° Fah. From the difficulty of respiration in so elevated a locality, and the severity of the climate, few of the monks survive the time of their vow, fifteen years from the age of eighteen, when they are devoted to this service. They are driven, often with ruined health, to retire to the more genial climate of Martigny, where there is a branch establishment for the brethren who cannot live on the mountains. The dogs kept at St. Bernard, to assist the brethren in their humane labours, are well known. In the museum of Bern the skin of one called 'Barry' is preserved, who is recorded to have saved the lives of fifteen human beings.

In the midst of tempests and snowstorms the monks, accompanied by some of these dogs, set out for the purpose of tracking those who have lost their way. If they find the body of a traveller who has perished, they carry it into the vault of the dead, where it is wrapped in linen, and remains lying on a table till another victim occupies the place. It is then set up against the wall among the other dead bodies, which, on account of the cold, decay so slowly that they are often recognized by their friends after the lapse of years. Adjoining this vault is a kind of burying-ground, where the bones are deposited when they accumulate too much in the vault. It is impossible to bury them, because there is nothing around the Hospice but naked rocks. In the church is the monument of General Desaix, who fell in the battle of Marengo. Napoleon ordered him to be embalmed, and assigned him a resting-place on the summit of the Alps.

In 1847 the revolutionary government of Valais laid the monastery under the heavy forced contribution of 120,000 francs (£4800), thereby much impairing the resources of the establishment, and according to a letter of the prior, written at the time, rendering its continuance impossible. Subscriptions from various quarters have since been made, to enable the brethren to continue their benevolent labours. The Pass of St. Bernard appears to have been known at a very early period; and a pagan temple formerly stood here, from which a Roman road led down the Piedmontese side of the mountains. The remains of a massive pavement are still visible; and the cabinet of the Hospice contains votive tablets, bronze figures, and other antiquities, found in the vicinity. The Hospice was founded in 962 by St. Bernard of Menthon, an Italian ecclesiastic, for the benefit of those who performed pilgrimages to Rome. In May, 1800, Napoleon led an army of 30,000 men, with its artillery and cavalry, into Italy by this pass.

BERNARD, LITTLE ST., a mountain, Italy, belonging to what are called the Grecian Alps, about 10 miles S. of Mont Blanc. It stands between Savoy and Piedmont, having the valley of the Isère, in the former, on the W., and that of the Doire, in the latter, on the E. The pass across it is one of the easiest in the Alps, and is supposed to be that which Hannibal used. The Hospice, at the summit of the pass, has an elevation of 7192 feet.

BERNARD OF CHARTRES, surnamed *Sylvestris*, a writer of the twelfth century, has been lauded as the ablest Platonic of his time, and wrote two works, now lost, in the one of which he endeavoured to reconcile Plato and Aristotle, and in the other he maintained the doctrine of a Providence, and proved that all material beings, possessing a nature subject to change, must necessarily perish. Another work under the name of Bernard Sylvestris still exists, and is composed of two parts, distinguished by the names of *Megacosmus* and *Microcosmus*, or the Great World and the Little World. He reduces all things to two elements—matter and ideas. Matter is in itself devoid of form, but susceptible of receiving it; ideas reside in the divine intellect, and are the models of life, the immutable principle of whatever must be, and from their union with matter all things result. M. Cousin has published extracts from the *Megacosmus* and *Microcosmus*.

BERNARD OF CLAIRVAUX, one of the most influential ecclesiastics of the middle ages, was born at Fontaines, in Burgundy, 1091, of a noble family. In 1113 he became a monk at Citeaux; in 1115 first abbot of Clairvaux, near Langres. An austere manner of living, solitary studies, an inspiring eloquence, boldness of language, and the reputation of a prophet, rendered him an oracle to all Christian Europe. He was named the *honeyed teacher*, and his writings were styled *a stream from paradise*. The doctrine of the immaculate conception of Mary was rejected by him. He principally promoted the crusade in 1146, and quieted the fermentation caused at that time by a party of monks against the Jews in Germany. He declined all promotion, and in the rank of abbot of his *beloved Jerusalem* (as he used to call Clairvaux), he continued with all humility, but with great boldness, his censures of the clergy, and his counsels to the popes. Innocent II. owed to him the possession of the right of investiture in Germany, and Eugenius III. his education. He was, at the same time, the umpire of princes and bishops, and his voice in the synods was regarded as divine. By his rigid orthodoxy and his mystical doctrines, which, though at times enthusiastic, were always directed to the promotion of

practical Christianity, he refuted the subtleties and dialectics of the scholastic philosophers, although his severity against Abelard and Gilbert of Porée can by no means be justified. Luther says of him, 'If there has ever been a pious monk who feared God, it was St. Bernard; whom alone I hold in much higher esteem than all other monks and priests throughout the globe.' Bernard died in 1153, and was canonized by Alexander III., in 1174. St. Bernard's Meditations was one of the books printed by Wynkyn de Worde (1496). The best edition of his works is that of Mabillon (Paris, 1690, two vols.; reprinted, Paris, 1839–40).

BERNARDIN DE ST. PIERRE. See PIERRE (ST.)

BERNARDINE MONKS. See CISTERCIANS.

BERNARDO DEL CARPIO, a famous hero, to whom the romancers, and even historians of Spain, have attributed many fabulous exploits, was born in the ninth century, the fruit of a secret marriage between Chimena, the sister of Alphonso the Chaste, and of Don Sancho, lord of Saldagua. Alphonso, irritated at the marriage, put out the eyes of Don Sancho, and imprisoned him in a castle, but spared Bernardo, and brought him up carefully at his court. In course of time Don Bernardo grew up to be a warrior, and distinguished himself in the Moorish wars, in the hope that the king would be bent to pity and set his father at liberty. Alphonso was inflexible, and Bernardo withdrew to his paternal domains; and, leaguing with other lords opposed to the court, set him at defiance. On the accession of Alphonso the Great, Bernardo returned to court, and again performed many exploits against the Moors, hoping to be rewarded with his father's freedom. He was once more denied the boon, and withdrew as before, not only leaguing with his friends, but making alliance with the Moors. Alphonso agreed at length to give up his father, on receiving the surrender of the castle of Carpio. Bernardo, true to his word, performed his part of the stipulation, and then learned with indignation that Alphonso had practised an infamous deception upon him, as his father had been for some time dead. He disdained any longer to tread the Spanish soil, and removed to France, where he spent the remainder of his life as a knight errant.

BERNAUER, AGNES, a Bavarian lady, celebrated for her beauty and her unfortunate fate. Agnes was born in humble life. She was the daughter of a poor citizen, said to be a barber of Augsburg. The exact time of her birth is not known; her death occurred on 2d October, 1435. Her story, though well authenticated, has become legendary from the interest attached to it, and is a favourite theme with the Bavarian poets.

Duke Albert of Bavaria, only son of the reigning prince, met Agnes at a tournament given in his honour by the grandees of Augsburg, became enamoured of her, and as he could not prevail on her to be his mistress, secretly married her. He conducted her to his own castle of Vohburg, and for a time succeeded in concealing the alliance he had contracted; but his father wishing to marry him to Anne, daughter of the Duke of Brunswick, he was compelled to acknowledge his marriage with Agnes. His father refused to credit it, and having caused the duke to be denied admission to a tournament on the plea that he was living unlawfully with a woman, Albert openly proclaimed his marriage, and caused Agnes to be recognized as Duchess of Bavaria, giving her for residence the castle of Straubing on the Danube. The Duke of Bavaria, incensed at this open avowal of a misalliance, caused Agnes to be seized in her castle during the absence of his son, brought her before a tribunal specially constituted, where she was accused of magic, and being condemned, had her hands tied together, and was thrown into the river. Albert in revenge took arms against his father, but the Emperor Sigismund finally reconciled them. The Duke Ernest raised a chapel to the memory of Agnes, and Albert married the Princess of Brunswick.

BERNAY, a town in France, in the department of Eure, 25 miles W.N.W. from Evreux, agreeably situated on the right bank of the Charentonne. It has two fine old churches, a communal college, a hospital, a court of first resort, a board of manufactures, an agricultural society, and a savings-bank. It has important manufactures of cloth and flannel, tape, linen, and cotton goods; and spins a good deal of cotton, thread, and worsted. It has also bleachfields, dyeworks, tanneries, &c. Trade principally in grain, cider, cloth, iron, paper, leather, linen, horses, and cattle. The horse-fair, held in Lent, is one of the greatest in France, and is attended by purchasers from all parts of the country to procure post and diligence horses, for which Normandy has long been celebrated. Pop. 7510.

BERNBURG, a town of Germany, in the duchy of Anhalt, capital of the former duchy of Anhalt-Bernburg, on both sides of the Saale, N.W. from Leipzig, with which, as well as with Berlin and Magdeburg, it is connected by railway. It is divided into the old, the new, and the high town; the first two surrounded by walls, and communicating by a bridge 173 feet long. Bernburg is well built, and contains several well-paved and well-lighted streets. The principal building is the palace, situated, with a garden, on the highest part of the high town. It is very ancient, but has received numerous modern additions, and contains a picture-gallery, theatre, and church. Besides an oil-mill, and several breweries and distilleries, there are manufactures of paper and earthenware, copper and tin wares, &c. Pop. 15,715.

BERNERS, or BARNES, JULIANA, an English lady of the fifteenth century, of whom little more is known than that she was prioress of the nunnery of Sopewell, near St. Alban's, and has her name prefixed as the writer or compiler to one of the earliest and most curious productions of the English press. The title of the second edition, printed in the abbey of St. Alban's in 1486, is The Boke of Hawkyng and Huntyng, with other Pleasures dyverse, and also Cootarmuries. The first edition (1481) does not treat of coat-armour or heraldry. This work, under the title of the Book of St. Alban's, became a popular manual of sporting science, and was several times reprinted in the sixteenth century. As a typographical curiosity, a small impression of it was published in 1811 by Mr. Haslewood.

BERNHARD, Duke of Weimar, general in the Thirty Years' war, born Aug. 6, 1604, the fourth son of Duke John of Saxe-Weimar, entered into the service of Holland, at that time the best school for a soldier, where Prince Maurice of Nassau (the creator of a better system of tactics), his brother Frederic Henry, the Marquis Spinola, and other great generals, were opposed to one another. Bernhard afterwards entered the Danish army employed in Holstein against the troops of the emperor, and commanded by the Margrave of Baden-Durlach, and was present at the conference of Lubeck, 1629, for negotiating peace. When Gustavus Adolphus entered Germany Bernhard joined him, and was present at the attack upon Wallenstein's camp in the neighbourhood of Nuremberg, Aug. 24, 1632. In the battle of Lützen, Oct. 6, 1632, he commanded the left wing of the Swedish army, avenged the death of Gustavus Adolphus, and, although himself severely wounded, put the right wing of the imperial troops to flight. Chancellor

Oxenstiern, the Swedish director of the war in Germany, after the death of the king, committed the command of half the army to him. Bernhard in 1633 took Bamberg, Cronach, Höchstädt, and Aichstädt; but his attempt upon Ingolstadt miscarried. He also brought the cities of Ratisbon and Straubing into his power, and frustrated Wallenstein's intentions. The King of Sweden made him Duke of Franconia. His impetuosity caused the defeat at Nördlingen (which see), August 24, 1634. He himself narrowly escaped being made prisoner. The prudence of Oxenstiern, and the valour of Bernhard, soon made amends for this fault. France, now entering into a closer alliance with Sweden, concluded a separate treaty with Bernhard, who went to Paris, Oct. 16, 1634. Bernhard promised for 4,000,000 livres to raise an army of 18,000 men on the Rhine to act against Austria. He now carried on the war in the country adjacent to the Rhine, took the fortress of Zabern in Alsace, spread his army over Lorraine and Burgundy, and vanquished the forces of the emperor in several battles. At the commencement of the year 1638 he laid siege to Rheinfelden not far from Basel. Here he was unexpectedly attacked in his camp, February 18, by an Austrian army that had advanced to raise the siege. Bernhard was obliged to retreat before superior numbers; but, having soon collected his forces, he attacked the Austrians by surprise, February 21, and obtained a complete victory. Several Austrian generals were made prisoners, and the fortress of Rheinfelden was obliged to surrender, May 13. He then undertook the siege of Breisach, the possession of which was necessary for maintaining himself in Alsace. An imperial army, under the command of General Goetze, that approached with the intention of raising the siege, was defeated with a great loss by Bernhard, July 30. Bernhard captured several places of inferior importance during the siege of Breisach, which, however, did not surrender until he had repeatedly defeated the Austrians, and then upon very moderate conditions, which Bernhard signed in his own name without mentioning France. The possession of Alsace, which he had before ceded to France under certain conditions, was now secured; but he also demanded Breisach as an appurtenance to Alsace. He garrisoned all the conquered places with German troops, and ordered money to be coined with the Saxon coat of arms and that of Breisach. In vain were the efforts of France to deprive the duke of the possession of Breisach by proposing to place a French garrison in the fortress: the duke declined not only this proposal, but also an invitation to Paris, and the offer of a marriage with the Duchess d'Aiguillon, niece of Cardinal Richelieu. Instead of that match, he proposed one with the Princess of Rohan, to which, however, the French court would not accede, lest the party of the Huguenots should be strengthened. It is probable that Richelieu had recourse to secret means in order to rid France of the duke, who was become formidable by his growing power. He was suddenly seized with a disorder which terminated his life, July 8, 1639. Most of the contemporary writers conjectured that Richelieu caused him to be poisoned: the duke himself had no doubt that he had swallowed poison. Immediately after his death several French commissioners appeared, who enlisted his troops into the French army: the command of them was committed to Marshal Guebriant. With Bernhard fell one of the chief supports of the Protestants. His successors, Banér and Torstenson, pursued his victorious course, and France seriously exerted herself in the war which continued for the benefit of the Protestants. In Bernhard a graceful person, intelligence, and valour were united with a magnanimity which could not be shaken by adverse events: his only fault was too great impetuosity.

BERNHARDI, August Friedrich, a German scholar, born in Berlin in 1768, died there in 1820. In his youth his attention was directed to universal language (that is, to language as far as it is common to all rational beings), to the mystery of its construction, the mathematics, as it were, of language. Bernhardi, considering all different languages as a whole, endeavoured to discover a universal grammar common to them all. The result of his researches appears in his works, Reine Sprachlehre (Abstract Grammar), 1801, two vols.; Angewandte Sprachlehre (Grammar in its Application), 1803; and Anfangsgründe der Sprachwissenschaft (Elements of the Science of Language), in which many philosophical principles of language are laid down. Bernhardi was a man of cultivated mind and extensive knowledge. He was also a professor and director of a classical school in Berlin.

BERNI, Francesco (also Berna, and Bernia), a poet of the sixteenth century, born at Lamporecchio, in the territory of Tuscany, towards the close of the fifteenth century, of a noble but poor Florentine family, went to Florence, and at the age of nineteen to Rome, where he lived under the care of his relation, Cardinal Bibiena, who, as he himself says, did him neither good nor harm, and he was at length obliged to enter the service of the Bishop of Verona, Ghiberti, datary of the papal chancery, as secretary. In the hope of promotion he took orders; but disgusted with the duties of his office, he sought recreation in amusements which displeased the prelate. A society had been established at Rome, consisting of young ecclesiastics of a jovial temper like Berni, and a poetical vein, who, in order to denote their love for wine and their careless gaiety, called themselves *i vignajuoli* (vine-dressers). Mauro, Casa, Firenzuola, Capilupi, &c., were of the number. They laughed at everything, and made sport in verse of the most serious, nay, the most tragic matters. Berni's verses were the most successful, and were written in so peculiar a style, that his name has been given to it (*maniera Bernesca* or *Berniesca*). When Rome was sacked by the troops of the Constable Bourbon, 1527, Berni lost all that he possessed. He afterwards made several journeys, with his patron Ghiberti, to Verona, Venice, and Padua. At length, wearied with serving, and satisfied with a canonship in the cathedral at Florence, in the possession of which he had been for some years, he retired to that place. The favour of the great, however, which he was weak enough to court, brought him into difficulties. He was required to commit a crime, and his refusal cost him his life. Alessandro de' Medici, at that time Duke of Florence, lived in open enmity with the young Cardinal Ippolito de' Medici. Berni was so intimate with both, that it is doubtful which first made him the proposal to poison the other. Certain it is that the cardinal died by poison in 1535. Berni died July 26, 1536; and if, as is asserted, his life was terminated by poison, then the crime must be imputed to Duke Alessandro.

In the burlesque style of poetry, Berni is still considered the best model. His satire is often very bitter, and frequently unites the good humour of Horace with the causticity of Juvenal. The extreme licentiousness of his writings is his greatest fault. It should, however, be considered that he wrote for his friends only, and that his works were not printed until after his death. The admirable ease for which his writings are distinguished, was the result of great efforts, since he repeatedly amended and corrected his verses. The same is asserted of Ariosto; and yet they are the most distinguished among the Italian

poets for the ease and fluency of their style. Berni also wrote Latin verses very correctly, and was well acquainted with Greek. His Rime Burlesche (Burlesque Verses) have great merit; so also has his rifacimento of Bojardo's Orlando Innamorato.—Another Berni (Count Francesco Berni, who was born in 1610, and died in 1673) has written eleven dramas and also several lyric poems.

BERNIER, François, born at Angers, in Anjou, about 1625, studied medicine, and after taking his degree at Montpellier, set out on his travels in 1654, and after visiting Egypt and Palestine, went into India, where his skill in medicine brought him into notice; and he remained for twelve years, residing chiefly at Delhi, as physician to the Great Mogul emperor Aurungzebe. On one occasion he accompanied the prime-minister on his march, at the head of an immense army, to the conquest of Cashmere, and in his travels, recording all that he saw, has given accounts full of interest, and recognized by subsequent travellers as remarkable for their fidelity. After his return to France he not only compiled his Travels and several volumes of history relating to the empire of the Great Mogul, but turned his attention to philosophical subjects, and published an abridgment of the philosophy of Gassendi. He also wrote a treatise, entitled Traité du Libre et du Volontaire. He died at Paris in 1688.

BERNINI, Giovanni Lorenzo, called *Il cavaliere Bernini*, born in Naples, 1598, is praised by his contemporaries as the Michael Angelo of modern times, on account of his success as a painter, a statuary, and an architect; but he deserves his fame principally in the latter character. Richly endowed by nature, and favoured by circumstances, he rose superior to the rules of art, creating for himself an easy manner, the faults of which he knew how to disguise by its brilliancy. From his early youth he manifested a great power to excel in the arts of design, and at the age of eight years executed the head of a child in marble, which was considered a remarkable production. That such rare endowments might be suitably cultivated, his father carried him to Rome. One of Bernini's first works was the marble bust of the prelate Montajo; after which he made the bust of the pope, and of several cardinals; also sundry figures of the natural size. He was not yet eighteen when he produced the Apollo and Daphne, in marble, a master-piece of grace and execution. Looking at this group near the close of his life, he declared that he had made very little progress since the time when that was produced. His manner was indeed more chaste and less affected in the early part of his career than at a later period. After the death of Gregory XV., Urban VIII., his successor, employed Bernini to prepare plans for the embellishment of the Basilica of St. Peter's, assigning to him a monthly pension of 300 crowns, which was afterwards augmented. Without forsaking sculpture, Bernini's genius embraced architecture, and he furnished the design for the canopy and the pulpit of St. Peter's, as well as for the circular place before the church. Among his numerous works were the palace Barberini, the belfry of St. Peter's, the model of the monument of the Countess Matilda, and the monument of Urban VIII., his benefactor.

In the year 1644 Cardinal Mazarin, in the name of the King of France, offered him a salary of 12,000 crowns; but he declined the invitation. Urban had scarcely closed his eyes, and Innocent X. ascended the papal throne, when the envy engendered by the merits of the artist and the favour bestowed on him broke forth. His enemies triumphed; but he regained the favour of the pope by a model for a fountain. About the same time he erected the palace of Monte Citorio. Alexander VII., the successor of Innocent X., displayed much taste for the arts, and favour to this artist, and required of him a plan for the embellishment of the Piazza di San Pietro. The admirable colonnade, which is so beautifully proportioned to the Basilica, was built under the direction of Bernini. We may also mention the palace Odescalchi, the Rotunda della Riccia, the house for novices, belonging to the Jesuits, on Monte Cavallo, &c. Louis XIV. having invited him, in the most flattering terms, to Paris, he set out from Rome, in 1665, at the age of sixty-eight, accompanied by one of his sons and a numerous retinue. Never did an artist travel with so great pomp and under such flattering circumstances. The reception which he met with in Paris was highly honourable. He was first occupied in preparing plans for the restoration of the Louvre, which, however, were never executed. But notwithstanding the esteem which he enjoyed in Paris, some disagreeable circumstances induced him to return to Rome: he left Paris loaded with presents. Cardinal Rospigliosi having become pope, Bernini was admitted to an intimate intercourse with him, and charged with several works; among others, with the decoration of the bridge of St. Angelo. In his seventieth year this indefatigable artist executed one of his most beautiful works, the tomb of Alexander VII. He still continued to devote himself to several works of architecture, as well as of statuary, with such ardour that, exhausted by his labours, he died Nov. 28, 1680, at the age of eighty-two. He was buried with great magnificence in the church of St. Maria Maggiore. To his children he left a fortune amounting to about 3,300,000 francs. Bernini's favourite maxim was, *Chi non esce talvolta della regola, non passa mai.* Thus he was of opinion that, in order to excel in the arts, one must rise above all rules, and create a manner peculiar to one's self. This Bernini has accomplished with a rare good fortune, but the influence of his style has been transient. His most eminent disciples are Pietro Bernini, his brother, a statuary, architect, and mathematician; Matthia Rossi, François Duquesnoi, surnamed *the Fleming*, and Borromini.

BERNIS, François Joachim de Pierres de, cardinal, and minister of Louis XV., was born at St. Marcel de l'Ardèche in 1715, of an ancient family, but little favoured by fortune, for which reason his parents destined him for the clerical profession. Madame de Pompadour presented him to Louis XV., who, being pleased with him, assigned to him an apartment in the Tuileries, with a pension of 1500 livres. His wishes were directed towards raising his income to 6000 livres. Not succeeding, however, in attaining this moderate fortune, he resolved to aim at a larger one. He went as ambassador to Venice, and obtained great respect in this difficult post. After his return he enjoyed the highest favour at court, and soon became minister of foreign affairs. The political system of Europe was changed at that time. France and Austria, hitherto enemies, united in an offensive and defensive alliance, which was succeeded by the Seven Years' war, so unfortunate for France. Bernis has been designated by several writers as the chief author of this alliance. Duclos, however, asserts that it was the intention of Bernis to maintain the old system, which, since the time of Henry IV., and especially since the time of Richelieu, had made France the protectress of the less powerful states of Germany, and the rival of Austria. Oppressed by the misfortunes of his country, which, in part at least, were ascribed to him, Bernis surrendered his post, and was soon after banished from court. His disgrace lasted till the year 1764, when the king appointed him Archbishop of Alby, and, five

years later, ambassador to Rome. Here he remained till his death. In the name of his court, and against his own opinion, he laboured to effect the abolition of the order of the Jesuits. When the aunts of Louis XVI. left France in 1791 they fled to him for refuge, and lived in his house. The revolution deprived him of his fortune, and the means of indulging his generous disposition. He was reduced to a state of poverty, from which he was relieved by a pension from the Spanish court. Bernis died at Rome, Nov. 2, 1794, nearly eighty years old. The easy poetry of youth had procured him a place in the French Academy. He himself is its severest critic. His verses have been reproached with affectation, negligence, and an excess of ornament and mythological images. Voltaire called him *Babet-la-Bouquetière*, from a fat flower-woman who sold her nosegays before the opera-house. Nevertheless, Voltaire had a great esteem for his talents, his judgment, his criticisms, and his character, as is evident from their correspondence (published in 1799 by Bourgoing), which, in every respect, is very honourable to Bernis. Another correspondence, between Bernis and Paris du Verney, appeared in print in 1790. After his death, Azara published his poem La Religion Vengée (Religion Avenged), which, though it contains many beautiful verses and sublime ideas, is deficient in fire and animation. A collection of Bernis' works was published in 1797 by Didot; another edition was published in 1825.

BERNOUILLI, or BERNOULLI, a family which has produced eight distinguished men, who have all cultivated the mathematical sciences with success. The family, emigrating from Antwerp on account of religious persecutions, under the administration of the Duke of Alva, fled first to Frankfort, and afterwards removed to Bâle, where it was elevated to the highest dignities of the republic.—1. JAMES, born at Bâle, 1654, became professor of mathematics there, 1687, and died 1705. The differential calculus discovered by Leibnitz and Newton was applied by him to the most difficult questions of geometry and mechanics: he calculated the loxodromic and catenary curve, the logarithmic spirals, the evolutes of several curved lines, and discovered the *numbers of Bernouilli*, as they are called.——2. JOHN, born at Bâle, 1667, was one of the greatest mathematicians of his time, and the worthy rival of Newton and Leibnitz. He was destined for commerce, but his inclination led him to the sciences, and from the year 1683 he principally devoted himself to medicine and mathematics. To him and his brother James we are indebted for an excellent treatise on the differential calculus. He also developed the method of proceeding from infinitely small numbers to the finite, of which the former are the elements or differences, and called this method the *integral calculus*. In 1690–92, he made a journey to France, where he instructed the Marquis de l'Hôpital in mathematics. At this time he discovered the exponential calculus, before Leibnitz had made any communications respecting it, and made it known in 1697. In 1694 he became doctor of medicine at Bâle, and in 1695 went, as professor of mathematics, to Groningen, where he discovered the mercurial phosphorus or luminous barometer, for which he received, from King Frederick I. of Prussia, a gold medal, and was made a member of the Academy in Berlin, afterwards of that in Paris, &c. After the death of his brother in 1705 he received the professorship of mathematics at Bâle, which he held until his death, January 1, 1748.——3. NICHOLAS, nephew of the former, born at Bâle in 1687, studied law, but more particularly devoted himself to mathematics; in 1705 went to Groningen to John Bernouilli; returned however with him to Bâle towards the close of the year, and became there professor of mathematics. He travelled through Switzerland, France, Holland, and England, and in 1713 became a member of the Academies of Science in London and Berlin. On the recommendation of Leibnitz he went as professor of mathematics to Padua in 1716, but returned to his native city in 1722 as professor of logic. In 1731 he became professor of the Roman and feudal law in that place, and died in 1759. The three following were sons of the above-mentioned John Bernouilli.——4. NICHOLAS, born at Bâle, 1695, became professor of law there in 1723, and died in St. Petersburg in 1726.——5. DANIEL, born at Groningen, February 9, 1700. He studied medicine, in which he took the doctor's degree, and at the same time was engaged in mathematical studies, in which his father had been his instructor. He visited Bâle, Heidelberg, Strasburg, Venice, and Padua. At the age of twenty-four he was offered the presidency of an academy about to be established at Genoa, but in the following year accepted an invitation to St. Petersburg. Accompanied by his younger brother John, he returned to Bâle in 1733; became there professor of anatomy and botany; in 1750 professor of natural philosophy; resigned this place, because of his advanced age, to his brother's son, the younger Daniel Bernouilli, in 1777, and died in 1782. He was one of the greatest natural philosophers as well as mathematicians of his time. At ten different times he received a prize from the Academy of Paris. In 1734 he shared with his father a double prize, given by this Academy for their joint essay on the causes of the different inclinations of the planetary orbits. Most of his writings are contained in the Transactions of the St. Petersburg, Paris, Berlin, &c., Academies, of which he was a member.——6. JOHN, born at Bâle in 1710, went to St. Petersburg in 1732, became professor of rhetoric at Bâle in 1743, and in 1748 professor of mathematics. He died in 1790. The two following were his sons.——7. JOHN, licentiate of law and royal astronomer in Berlin, was born at Bâle in 1744, and died, 1807, in Berlin, whither he had been invited in the nineteenth year of his age. He had travelled through all the countries of Europe, and lived after 1779 in Berlin, where he had become director of the mathematical department of the Academy. He is the author of numerous works.——8. JAMES, was born at Bâle in 1759; went to St. Petersburg, where he became professor of mathematics; married a grand-daughter of Euler, but died in 1789, in the thirtieth year of his age, of an apoplexy, while bathing in the Neva.

BERNSTORFF, the name of a German noble family, many members of which have been distinguished. The most so was JOHANN HARTWIG ERNST, count von Bernstorff, Danish statesman under Frederick V. and Christian VII., born in Hanover, May 13, 1712. His father was secretary of state in Denmark. In 1750 he was made member of the council of state, after having served for a long time as foreign minister. He soon became the most influential member of the government, which distinguished itself under his direction by a wise neutrality during the Seven Years' war, and other political disturbances in Europe; by liberal measures for improving the condition of the Danish peasantry, who were even then in a state of bondage; by promoting science, and sending an expedition to Asia, which the famous traveller Niebuhr accompanied. He himself set the example of manumitting the peasants, and gave the fourth part of his income to the poor. By his efforts Denmark acquired Holstein. Bernstorff is described by all historians as a model of wisdom, benevolence, and intelligence. He died Feb. 19, 1772.

BEROALDO, FILIPPO, one of the most celebrated literati of the fifteenth century, was born at Bologna in 1453; early gave proofs of great abilities and a prodigious memory, and after completing his education opened a school, successively at Bologna, Parma, and Milan, and taught with great success. He afterwards went to Paris, and gave lectures which attracted a numerous audience and greatly extended his fame. His townsmen now became desirous to possess him, and he returned to Bologna, where he spent the remainder of his life as professor of belles-lettres, and died in 1505. He is now chiefly known as the editor of some good editions of the classics, and the author of a curious tract entitled Declamatio Ebriosi, Scortatoris et Aleatoris, in which the drunkard, rake, and gambler, represented as three brothers, debate which of them, as being the most vicious, should be excluded from sharing in his father's inheritance.

BEROSUS, according to some a Chaldean by birth, and a priest of the temple of Belus at Babylon, and according to others a contemporary of Alexander the Great, is celebrated both as a historian and an astronomer, though it has been alleged that his name merely has been used for the purpose of giving a reputation to what others had written. His history, giving an account of the Babylonian Chaldeans and their kings, consisted of two books written in Greek, and professed to be founded on the ancient archives of the temple of Belus. It exists only in fragments, which are contained in the writings of Josephus, Eusebius, and others, and are given in a collected form by Richter (Leipzig, 1825). According to Pliny the astronomical observations contained in the works of Berosus extended over a period of 480 years.

BERQUIN, ARNAUD, born at Bordeaux in 1749, first attracted notice by some poems which he entitled Idylles, and by several translations from the English under the name of Tableaux Anglais, but is best known by his work entitled Ami des Enfans, for which he received the prize of the French Academy in 1789, as the most useful work which made its appearance during that year. It has been translated into most European languages, and still continues a standard work for the amusement and instruction of young people. It cannot, however, lay claim to the merit of originality, as both the title and much of the substance are derived from a work in German by Weiss, entitled Kinderfreund. Berquin, though specially devoted to the instruction of youth, was not incapable of excelling in graver literature, and was for some time the editor of the Moniteur. In 1791 he was one of the candidates for the office of tutor to the dauphin, the son of Louis XVI. and Marie Antoinette, but died before the decision was given.

BERRI, or BERRY, before the revolution of France, a province and dukedom of that country, of which Bourges was the capital, almost in the centre of France. With the exception of the arrondissement St. Amand, which belonged to the Bourbonnais, it now forms the departments Indre and Cher.

BERRI, or BERRY, CHARLES FERDINAND, DUKE OF, second son of the Count d'Artois (afterwards Charles X.) and Maria Theresa of Savoy, born at Versailles, Jan. 24, 1778. He was educated along with his elder brother the Duke of Angoulême. In 1792 he fled with his father to Turin, served under him and Condé on the Rhine, and early learned the art of winning the love of the soldiers. With his family he repaired to Russia, and in 1801 to England, where he lived alternately in London and Scotland, continually occupied with plans for the restoration of the Bourbons. April 13, 1814, he landed at Cherbourg, and passed through the cities of Bayeux, Caen, Rouen, &c., gaining over the soldiers and National Guards to the cause of the Bourbons, distributing alms, and delivering prisoners. He made his entrance into Paris, April 21, where he gained popularity by visiting the merchants, manufacturers, and artists. May 15 he was appointed colonel-general, receiving a civil list of 1,500,000 francs. August 1 he set out on a visit to the department of the North, and the fortified places in Lorraine, Franche-Comté, and Alsace. When Napoleon landed from Elba, the king committed to Berri the chief command of all the troops in and round Paris. All his efforts to secure their fidelity proving ineffectual, he was obliged to retreat on the night of March 19, with the troops of the household to Ghent and Alost, where the king then was. The battle of Waterloo enabled him to return to Paris, where he arrived July 8, and surrendered his command over the troops of the household into the hands of the king. In August he was made president of the electoral college of the department of the North. At the opening of the chambers in Paris he took the oath to maintain the constitution, and was appointed president of the fourth bureau; but he soon retired from public life. He died Feb. 14, 1820, of a blow inflicted the previous evening by a political fanatic named Louvel (see LOUVEL). The duke left by his wife Carolina Ferdinanda Louisa, eldest daughter of King Francis I., ruler of the Two Sicilies, whom he married June 17, 1816, only a daughter, Louise Marie Thérèse, afterwards Duchess of Parma; but his widow was afterwards delivered of a prince, now known as Count de Chambord.

BERRUGUETE, ALONZO, a Spanish painter, architect, and statuary, born at Paredez de Nava, near Valladolid, in Spain; went in early life to Italy, studied in the school of Michael Angelo, and became intimate with Andrea del Sarto, Baccio Bandinelli, and other celebrated artists. On his return he was appointed painter to Charles V., and died at Toledo in 1561. His principal architectural works are the new palace at Granada, and the townhouse of Seville; his skill as a statuary is seen to great advantage in the choir of the cathedral of Toledo, and the tomb of the vice-chancellor of Aragon at Saragossa. His best paintings are at Valladolid, Toledo, and Salamanca.

BERSERKER, a descendant of the eight-handed Starkader and the beautiful Alfhilde, was, according to the Scandinavian mythology, a famous warrior. He disdained the protection of armour, whence he received his name, which signifies, according to Ihre, *armourless*. He raged like a madman in battle. He killed King Swafurlam, and married his daughter, by whom he had twelve sons as untamable as himself. They were also called *Berserker*, and since their time the name has been commonly given to men of headstrong violence.

BERTHIER, ALEXANDER, Prince of Neufchatel and Wagram, marshal, vice-constable of France, &c.; born at Versailles 20th Nov. 1753; son of a distinguished officer; was, while yet young, employed in the general staff, served in America, and fought with Lafayette for the liberty of the United States. In the first years of the French revolution he was appointed major-general in the National Guard of Versailles, and conducted himself in this post with uniform moderation. Dec. 28, 1791, he was appointed chief of the general staff in the army of Marshal Luckner, marched against La Vendée in 1793, joined the army of Italy in 1795, and as general of division and chief of the general staff contributed much to the success of the campaign. In October, 1797, General Bonaparte sent him to Paris to deliver to the Directory the treaty of Campo-Formio. In Jan. 1798, he received the chief com-

mand of the army of Italy, and was ordered by the Directory to march against the dominions of the pope. In the beginning of February he made his entrance into Rome, abolished the Papal government, and established a consular one. Being much attached to General Bonaparte, he followed him to Egypt as chief of the general staff. After the 18th of Brumaire, Bonaparte appointed him minister of war. He afterwards became general-in-chief of the army of reserve, accompanied Bonaparte to Italy in 1800, and contributed to the passage of St. Bernard and the victory at Marengo. He signed the armistice of Alessandria, formed the provisional government of Piedmont, and went on an extraordinary mission to Spain. He then received again the department of war, which, in the meantime, had been in the hands of Carnot. He accompanied Napoleon to Milan, June, 1805, to be present at his coronation, and in October was appointed chief of the general staff of the grand army in Germany. October 19 he signed the capitulation of Ulm with Mack, and Dec. 6 the armistice of Austerlitz. Having in 1806 accompanied the emperor in his campaign against Prussia, he signed the armistice of Tilsit, June, 1807. He afterwards resigned his post as minister of war, and having been appointed vice-constable of France, married, in 1808, Maria Elizabeth Amelia, daughter of Duke William of Bavaria-Birkenfeld, and continued to be the companion of Napoleon in all his expeditions. In the campaign against Austria in 1809, he distinguished himself at Wagram, and received the title of *Prince of Wagram*. In 1810, as proxy of Napoleon, he received the hand of Maria Louisa, daughter of the Emperor Francis I., and accompanied her to France. Somewhat later Napoleon made him colonel-general of the Swiss troops. In 1812 he was with the army in Russia, as chief of the general staff, which post he also held in 1813. After Napoleon's abdication he lost his principality of Neufchatel, but retained his other honours, and possessed the favour and confidence of Louis XVIII., whom, after Napoleon's return, he accompanied to the Netherlands, whence he repaired to his family at Bamberg, where he arrived May 30. After his arrival at this place, he was observed to be sunk in a profound melancholy; and when, on the afternoon of June 1, the music of the Russian troops, on their march to the French borders, was heard at the gates of the city, he put an end to his life by throwing himself from a window of the third story of his palace. (See Mémoires d'Alexandre Berthier, Pr. de Neufchatel et de Wagram, Paris, 1826.) He left a son, Alexander (born in 1810), one of the most zealous adherents of Napoleon III., and two daughters.

BERTHOLLET, CLAUDE LOUIS, COUNT, member of the scientific academies at Paris, London, Turin, Haarlem, &c.; one of the most eminent theoretical chemists of our times; born at Talloire, in Savoy, Dec. 9, 1748; studied medicine at Turin; went in 1772 to Paris, where he became connected with Lavoisier, was admitted in 1780 a member of the Academy of Sciences in that city; was made in 1794 professor in the normal school there, and was sent to Italy in 1796, in order to select the plunder that was to be carried to Paris. He followed Bonaparte to Egypt, and returned with him in 1799. After the 18th of Brumaire he was made a member of the *senat-conservateur;* afterwards count and grand-officer of the Legion of Honour. In 1804 Napoleon appointed him senator for the district of Montpellier. In 1813 he received the grand cross of the order of the Reunion. April 1, 1814, however, he voted for the establishment of a provisional government and the dethronement of Napoleon. Louis XVIII. made him a peer; but Napoleon passed him by in 1815. After the restoration of Louis, he took his seat again in the chamber of peers. Among the inventions and new processes with which the sciences and the arts were enriched by him, the most important are those for the charring of vessels to preserve water in ships, for the stiffening and glazing of linen, for the artificial production of nitre, &c., but principally that for the bleaching of vegetable substances by means of chlorine, which, since 1786, has been in general use in France. Besides different essays in the collections of the Academy and the Institute, he has written several larger works, among which his Essai de Statique Chimique (1803, two vols.; translated into English, German, and Italian) must be considered as the most important. The complicated phenomena of chemistry are reduced in this work to the strict and simple laws of mechanics. He had also a large share in the reformation of the chemical nomenclature, as well as in the publication of the work that appeared on this subject in Paris, 1787—Méthode de Nomenclature Chimique. He died in Paris, November 7, 1822.

BERTHOLLETIA, the name given in honour of the celebrated philosopher Berthollet to a remarkable genus of trees of the natural order Lecythidaceæ, of which only one species, the *B. excelsa*, is known. This tree forms vast forests on the banks of the Oronoco, averaging 100 feet in height, with a stem only 2 feet in diameter, and destitute of branches till near the top, which becomes bushy and hangs gracefully, producing the well-known Brazil nuts of commerce. The nuts or seeds are contained in a large, round, and very strong seed-vessel, to the number of from fifteen to fifty or more. The nuts contain a great deal of oil. Considerable quantities are exported from Para to the United States and England.

BERTHOUD, FERDINAND, celebrated for his marine chronometers, born at Plancemont, in the county of Neufchatel, in 1727, was destined for the church, but at the age of sixteen conceived an irresistible inclination for mechanics. His father caused him to be instructed in the art of watchmaking, and, to afford him an opportunity of perfecting his knowledge, sent him to Paris. He resided in this city from 1745, and there made his first marine chronometers, which have been used by French navigators on so many occasions for extending and correcting geographical knowledge. He left several works relating to his art. He died in 1807. His nephew, LOUIS BERTHOUD, his pupil and the heir of his talents, has extended his improvements still further. His chronometers are in the hands of almost all navigators, and are even more convenient than those of his uncle. They are famous for accuracy.

BERVIC, CHARLES CLEMENT, one of the most distinguished engravers of the French school, was born at Paris in 1756, studied his art under George Wille, and may be considered his most eminent pupil. The works of Bervic are among the best of the French school, but are not numerous. The most celebrated of them is the full-length figure of Louis XVI. after a picture of Callot. The copies are very rare and dear, because the plate was broken to pieces in the revolutionary tumults of 1793. The exactness of his drawing, the firmness and brilliancy of his touch, the purity and correctness of his design, and the happiness with which he transferred to his plate the beauties of the original, gave a high character to his productions. He died in 1822.

BERWICK, JAMES FITZ-JAMES, DUKE OF, commanded the armies of England, France, and Spain, was a peer of England and France, as well as a grandee of Spain, and was knighted by the sovereign

of each of these countries. He was the natural son of the Duke of York, afterwards King James II., and Arabella Churchill, sister of the Duke of Marlborough; was born at Moulins in the Bourbonnais, in 1670, and first went by the name of Fitz-James. He received his education in France, and served his first campaigns in Hungary under Charles, duke of Lorraine, general of Leopold I. He returned to England at the age of seventeen, and received from his father the title of Duke. On the landing of the Prince of Orange in 1688 he went to France with his father, whom he afterwards accompanied on the Irish expedition, fighting bravely, and being wounded at the battle of the Boyne (July 1, 1690). He afterwards served under Luxembourg in Flanders; in 1702 and 1703 under the Duke of Burgundy; then under Marshal Villeroi, and was naturalized in France. In 1706 he was made marshal of France, and was sent to Spain, where he gained the battle of Almanza, which rendered King Philip V. again master of Valencia. In 1709 he went to take the command in Dauphiné, and the measures which he took to cover this and the neighbouring provinces against the superior forces of the Duke of Savoy gained him a great reputation. In 1718 and 1719 he was obliged to serve against Philip V., who from gratitude to the marshal had taken a son of his into his service. On his entrance into the Spanish dominions he wrote to his son, the Duke of Liria, admonishing him to do his duty to his sovereign. At the siege of Philipsburg, on the Rhine, in 1734, his life was terminated by a cannon-ball. His memoirs were published originally in French, and have gone through two or three editions in English.

BERWICK, North, a royal and parliamentary borough and sea-port in Haddingtonshire. It is built on a sandy plain, and consists chiefly of two streets, which are straight and tolerably well built. It is a very ancient burgh, but its charter having been lost, it obtained another from James VI. The harbour is small but of easy access. Being situated near the entrance of the Firth of Forth, North Berwick had formerly a considerable trade, but it now employs only a few fishing smacks and vessels for the exportation of grain. Many strangers come in summer to the sea-bathing. The ancient castle of Tantallan, formerly one of the strongholds of the Douglas family, stands about three miles east of the town, surrounded on three sides by the sea, and on the east by a deep fosse with a drawbridge. It was destroyed by the Covenanters in 1699. The existing ruins are much admired. Pop. in 1871, 1418.

BERWICKSHIRE, a maritime county of Scotland, bounded on the E. by the German Ocean; on the N. by East Lothian; on the W. by the counties of Roxburgh, Peebles, and East Lothian; and on the S. by the river Tweed and the English borders. It is nominally divided into the three districts of Lauderdale, Lammermoor, and the Merse or March; the first of which divisions is the opening or valley in the Lammermoor Hills, through which flows the river Leader. Lammermoor comprehends the ridge of hills which divides the county from East Lothian, and the Merse or March includes the fertile and populous plain extending from the same hills along the banks of the Tweed. The latter district is remarkable for the goodness of the soil and the excellent system of cultivation, for which the whole county is also celebrated. Berwickshire contains the royal and parliamentary burgh of Lauder, the towns of Dunse and Eyemouth, each with over 2000 inhabitants; and the considerable villages of Coldstream, Earlston, Greenlaw (the county town), Chirnside, Ayton, and Coldingham. The principal rivers are the Tweed, the Leader, the Eye, the Whiteadder, and Blackadder; and all except the last contain salmon, of which great quantities are shipped from Berwick for London. The minerals hitherto discovered in this county are few, and by no means valuable. They consist chiefly of copper, coal, and ironstone, but of each very sparingly. There is, however, plenty of freestone, and also of marl, to which agriculturists in this quarter prefer lime-stone, though brought from a considerable distance. The celebrated mineral water called Dunse Spa, similar to that of Tunbridge, is situated about a mile from that town. Vast quantities of agricultural produce are shipped from the ports of Berwick and Eyemouth, and much is also sent to the weekly markets of Edinburgh, Dalkeith, Haddington, and Dunbar. Very few manufactures are established in this county, the principal one which it supplies beyond domestic consumption being that of paper. The situation of Berwick as a border county caused it to abound in strong castles and fortified places, traces of which are to be found in almost every parish. The area of the county is 294,805 acres. Pop. in 1861, 36,613; in 1871, 36,486.

BERWICK-UPON-TWEED, a town of England, forming a county of itself but generally regarded as in Northumberland, on the north or Scottish side of the Tweed, within half a mile of its confluence with the German Ocean, and 48 miles south-east of Edinburgh. It is surrounded by walls, not long since regularly fortified, formed of earth and faced with stone, along which is an agreeable promenade. The streets are for the most part narrow, steep, straggling, and irregular, though some of the principal ones are wide and open. There are in all some twelve churches in the town; the principal schools are the Corporation Academy for the education of the children of burgesses, and the Classical Academy. Among the principal buildings are the town-hall, with a handsome portico and a spire; the infantry barracks; the corn-exchange, opened in 1858, a handsome structure in the semi-classic style. The Tweed is crossed at the town by an old bridge of fifteen arches, measuring 1164 feet in length and only 17 in width, and by a magnificent railway viaduct of stone, 667 yards long and 184 feet in extreme height, with 28 semicircular arches. The chief industries carried on are iron-founding, the manufacture of engines and machinery, linen, sack and sail cloth, ropes, hosiery, &c. Shipbuilding is also carried on. There is a considerable shipping trade, the total tonnage entered in 1871 being 37,520 tons; cleared, 13,375. The chief exports are salmon—of which great quantities are caught in the Tweed—cod, haddocks, herrings, corn, and coal.

In the beginning of the twelfth century, during the reign of Alexander I., Berwick was part of his realm of Scotland, and the capital of the district called Lothian. Soon after this date it became populous and wealthy, was the chief sea-port of Scotland, contained a strong castle, with churches, hospitals, and monastic buildings, and was created one of the four royal burghs of Scotland. In 1216 the town and castle were stormed and taken by King John. During the competition between Baliol and Bruce for the Scottish throne the English Parliament sat in Berwick; and in the hall of the castle Edward I. pronounced judgment in favour of Baliol. Bruce retook the town and castle in 1318; but, after undergoing various sieges and vicissitudes, both were surrendered to Edward IV. in 1482, and have ever since remained in possession of England. By 6 and 7 Will. IV. Berwick is constituted 'a county of itself to all intents and purposes' (excepting the return of members of Parliament). Pop. in 1861, 13,265; in 1871, 13,231.

BERYL, or EMERALD, a well-known species in mineralogy, sometimes massive in its structure, though commonly found crystallized in regular six-sided prisms, often deeply striated longitudinally, and terminated at one or both extremities by a rough, imperfect plane, or, more rarely, by a very flat, six-sided pyramid, of which the summit is replaced. Its crystals are of various dimensions, being from half an inch to upwards of a foot in length, and from a quarter of an inch to ten inches in diameter. The larger crystals, however, are inferior to the smaller, in regard to those qualities for which this species is esteemed. The lustre of the beryl is vitreous; its colour green, passing into blue, yellow, and white. The brightest of these colours is emerald green, which, as it is rarely known to pass insensibly into the paler hues, has been made the basis of a distinct species in those specimens in which it occurs under the name of *emerald*. This distinction of species is not considered at present as well-founded; and the beryl and emerald are looked upon as identical by most mineralogists. It is translucent or transparent, and its hardness enables it to scratch quartz. Its specific gravity is from 2·6 to 2·7. It is composed of silica, 68·35; alumina, 17·60; glucina, 13·13; oxide of iron, ·72, with a trace of lime and oxide of chromium and tantalic acid.—The beryl is widely diffused. It belongs to the primitive rocks, and is embedded in veins of quartz and feldspar, which traverse granite and mica slate. It is also found in great abundance in a compact ferruginous clay in Daouria, and in fractured crystals and rolled masses in secondary deposits, where it is not supposed to have had its origin. Some of the most remarkable localities of beryl are in Siberia, at Cairngorm in Scotland, at Limoges in France, and in Massachusetts, Maine, and New Hampshire in the United States. The deep-green variety, emerald, so much valued as a gem, comes from Peru and Upper Egypt: a few fine crystals have also been obtained from granite veins at Topsham in Maine.

BERZELIUS, JOHN JAMES, BARON, one of the greatest chemists of modern times, born in 1779, at Westerlösa, near Linköping, East Gothland, where his father was chaplain, received his first education at home, then attended the Linköping gymnasium, and in 1796 proceeded to the University of Upsal to study medicine. Here, however, his attention was chiefly attracted by the initiatory branches of natural science, and more especially by chemistry. The first-fruit of his studies, and of a year's residence as assistant to a physician at the famous watering-place of Medewi, was the Nova Analysis Aquarum Medurensium (Upsal, 1800). After publishing a tract entitled De Electricitatis Galvanicæ in Corpora Organica Effectis (Upsal, 1802), and taking his doctor's degree, he was appointed by the board of health in 1802 adjunct of medicine and pharmacy in Stockholm. With these offices, together with medical practice, he combined a course of public lectures on experimental chemistry and private instruction in pharmacy, till 1806, when he was appointed teacher of chemistry in the military academy. The following year he became professor of medicine and pharmacy in Stockholm. Here, along with other medical practitioners, he instituted the Swedish Medical Society. In 1808 he was admitted a member of the Academy of Sciences at Stockholm, in 1810 one of its directors, and in 1818 its perpetual secretary. This office he continued to hold during the remainder of his life. In 1818 the king, while allowing him to retain his own name, made him a noble; and in 1835, on the occasion of his marriage with a daughter of Poppius, a councillor of state, he was named a baron. As deputy to the National Assembly and a councillor of state, he did not display much activity, but his services to chemical science have been so numerous and important that it is difficult to bring them briefly under review. The existing state of chemistry is founded in a great measure on his discoveries and views, though, by the rapid development of the science, the edifice which he erected has undergone many alterations, and several defects have been discovered in it. Hence his views in regard to atomic weights, his electro-chemical theory, and his mode of procedure in organic chemistry, have met with many opponents. He discovered selenium and thorium, first exhibited calcium, barium, strontium, tantalum, silicium, and zirconium in the elemental state, and investigated whole classes of compounds, as those of fluoric acid, the metals in the ores of platinum, tantalum, molybdenum, vanadium, sulphur salts, &c. He introduced a new, or at least a wholly altered nomenclature and classification of chemical compounds. In short, there is no branch of chemistry to which he has not rendered essential service; and his labours are so numerous that, when the accuracy with which they have been executed is kept in view, it becomes almost incomprehensible how one man should have been able to perform them. It ought to be especially mentioned that he never rested satisfied with the bare investigation of isolated facts, but always extended his investigations over a wide field, so as to contribute to the advancement of chemistry as a whole. In addition to his numerous communications to the journals and periodicals of the period, may be mentioned, among his separate works, his View of the Composition of Animal Fluids, New System of Mineralogy, Essay on the Theory of Chemical Proportions, and above all his Text-book of Chemistry, which has been translated into most European languages. As secretary of the Academy of Sciences, he published an annual account of the progress of chemistry and mineralogy, which, having been continued during twenty-seven years, extends to as many volumes. He died in 1848.

BESANÇON, a fortified town of France, capital of the department Doubs, 206 miles S.E. of Paris. It is agreeably situated at the extremity of a valley watered by the Doubs, which almost surrounds the town, and divides it into two parts. These communicate with each other by a stone bridge, part of which is a Roman structure of large blocks, and part a modern erection, for the purpose of enlarging the roadway. The town is surrounded by hills, covered with vineyards. The isthmus or peninsula on which it is built is composed of a mass of rocks crowned by the citadel, which commands the country towards the north, but the citadel itself is commanded by several eminences in the neighbourhood, on which forts have been erected for the purpose of securing the approaches. Besançon is one of the strongest towns in France, and also one of the best built. The streets are spacious and well laid out, and the squares are adorned with fountains. A splendid promenade is formed within the town on the banks of two branches of the Doubs. Among the public buildings are the cathedral and three other churches (containing some fine pictures and sculptures), the hospital, the prefecture, the college, and the palace of justice. The citadel is one of Vauban's finest works. There are here a theatre, a large and valuable public library, a museum, a botanic garden, school of artillery, lyceum, &c. In the environs are the splendid ruins of the castle of Montfaucon. The trade and manufactures are extensive. The latter comprise linen, cotton, woollen, and silk goods, ironmongery, &c.; but the principal industry is watchmaking. It employs about 13,000 workmen who make as

many as 335,000 watches yearly. There are also extensive foundries, breweries, saw-mills, and tanneries. Besançon is the ancient Vesontio, Besontium or Bisontium, which is mentioned by Cæsar, who drove the Sequani from it in 58 B.C., as a place of great extent and natural strength. In the fifth century it came into the possession of the Burgundians, in the twelfth it passed along with Franche-Comte to the German Empire. It was taken by Louis XIV. in 1668 and 1674, and in 1679, along with the rest of Franche-Comté, it was ceded to France. It remained the capital of Franche-Comté till 1793, and had a parliament, university, &c. Several of the streets and places still bear their old Roman names, and there are numerous Roman remains, especially a triumphal arch of the Emperor Aurelian, an aqueduct, an amphitheatre, and a large theatre. Pop. 46,961.

BESSARABIA, since the peace of Bucharest, in 1812, between Turkey and Russia, a province in the extreme S.W. of European Russia, stretching in a north-easterly direction from the Black Sea, between the Jalpuch and Pruth, and the Dniester. A portion of it at the S.E. extremity was ceded to Turkey in 1856, and its area is now about 14,000 square miles; its pop. 1,052,013. Bessarabia is a plain country, fertile in grain, but is mostly used for the pasturage of sheep and horses. Most of the inhabitants are Walachians, Gipsies, and Tartars. The capital is Kishenau, a large and important commercial town. On the Dniester are the fortresses of Chotin and Bender; at its mouth that of Akjerman or Akerman. The pop. has been much increased by colonists from Poland, Germany, France, &c. A considerable number of troops are kept in Bessarabia to protect the frontiers. Many mechanics are thus drawn there to supply the wants of the army. The chief mineral product is salt, obtained from lakes.

BESSEL, FREDERICK WILLIAM, a celebrated German astronomer, born at Minden in 1784, entered a commercial house at Bremen in his fifteenth year, and there acquired such a decided taste for geographical and maritime studies that he often devoted to them part of the night. He next turned his attention to astronomy, and soon found it to be his true vocation. An astronomical tract which he had drawn up brought him into communication with Olbers, who encouraged him in his labours, and procured for him the appointment of inspector of astronomical instruments to the University of Göttingen. In 1810 he removed to Königsberg, and in 1812–13 he superintended the construction of the observatory of this town. From 1824 to 1833 he completed a series of 75,011 observations on the celestial zone included between 15° N. and 15° S. declination. These observations included all the stars in the zone as far as the ninth degree. A dissertation which he published in 1844 contains important investigations on the mutability of the movements of the fixed stars. An important share in the discovery of the new planet Neptune belongs to him, as in a paper read in 1840 he called attention to the existence of a planetary mass beyond Uranus, founding on considerations which were afterwards happily proved to be correct. His health began to give way in 1844, and after a lingering illness he died in 1846. His principal works are an Essay on the Path Traversed by the Comet of 1807, Astronomical Observations during various years, Determination of the Length of the Pendulum which Beats Seconds at Berlin, Investigation and Measurements made with a view to establish a Metrical Unit for Prussia, Measure of the Distance of the Sixty-first Star of the Constellation of the Swan, and Popular Lectures on Scientific Questions. These, consisting of papers which Bessel had read before the Physico-economical Society of Königsberg from 1832-1844, were published after his death by his friend Schumacher, in 1848, at Hamburg.

BESSEMER IRON AND STEEL. See IRON.

BETEL is the leaf of a climbing East Indian plant (*Piper betel*), which belongs to the same tribe as pepper, and in shape and appearance is not much unlike ivy, but is more tender, and full of juice. It is insipid to the taste, and generally narcotic. There is an almost incredible consumption of betel throughout India, and other parts of the East. The inhabitants chew it almost incessantly, and in such quantity that their lips become quite red and their teeth black—a colour greatly preferred by them to the whiteness which the Europeans so much affect. They carry it in little white boxes about their persons, and present it to each other, by way of compliment and civility, in the same manner as Europeans do snuff. This is done by the women as well as by the men; and it would be considered an offence, if those to whom it is offered should refuse to accept of and chew it. The leaves are sometimes used alone, but much more commonly when covered with a kind of lime made of sea-shell, and wrapped round slices of the areca-nut, the fruit of the areca-palm, of the size of a small egg, and resembling a nutmeg deprived of its husk.

BETHANIA, or BETHANY, a village at the foot of Mount Olivet, on the E. side, about two miles E. of Jerusalem, where Lazarus dwelt and was raised from the dead, and where the ascension of Christ is related to have taken place. The house and grave of Lazarus, and the house of Mary Magdalene, are still shown to curious travellers. The name of Bethania was sometimes extended to the whole tract from the village itself to Bethphage.

BETHESDA, a pool in Jerusalem, the name of which signifies *house of mercy*. In the five halls or porticos near it many patients lay waiting, according to the account of John (ch. v.), for the moving of the waters, to bathe in. According to the opinion of the Jews, an angel descended, at a certain time, into the pool and troubled the water, and whoever first entered the water after this agitation was cured.—*To lie at the pool of Bethesda*, is used proverbially, in Germany, in speaking of the theological candidates who are waiting for a benefice.

BETHLEHEM, the birth-place of our Saviour; a village, formerly a town, in Palestine, a part of Syria, in the pashalic of Damascus, five miles from Jerusalem, at the foot of a hill covered with vines and olive-trees, which however is not the Mount of Olives mentioned in the Bible. An aqueduct conveys water from the hill to the village. It has about 3000 inhabitants, chiefly Christians, who make rosaries, crucifixes, &c., for pilgrims. There are three convents here, for Catholics, Greeks, and Armenians. The greatest ornament of the place is the stately church within the Armenian convent, said to have been erected by the Empress Helena over the place where Christ was born, and bearing her name, but really built by Justinian. It is built in the form of a cross, and the top commands a fine view over the surrounding country. In a rich grotto, furnished with silver and crystal lamps, under the choir of this church, a trough of marble is shown, which is said to be the manger in which Jesus was laid after his birth. Several spots mentioned in the Bible are shown here.

BETHLEHEM. There are many places in the United States with this name. One of the most important is the borough in Northampton county, Pennsylvania, on the Lehigh, across which is a bridge 400 feet long, forty-eight miles N.N.W. Philadelphia. Pop. 4512. It is pleasantly situated, regularly laid

out, and built chiefly of stone. It was founded in 1741 by Moravians, who have a large Gothic church here. There are also three semi-conventual houses for unmarried young men, young women, and widows, a celebrated female seminary, and several schools.

BETHLEM-GABOR, that is, *Gabriel Bethlem*, son of a Calvinistic gentleman in poor circumstances, entered the service of Gabriel Bathori, prince of Transylvania, fought under his orders, and then repaired to Constantinople, where his courage gained him the esteem of the Turks. Prompted by ambition, he became ungrateful to his first benefactor; and after bringing Bathori into bad odour both with the Transylvanians and the Turks, managed to make the latter declare war, and actually headed a Turkish army against him. His treachery was successful, and in 1613 he was proclaimed Prince of Transylvania. Shortly after, having succeeded in stirring up the Hungarians against the Emperor Frederick II., he took several places, and in 1618 assumed the title of King of Hungary. Thereafter, supported by the Turks and Tartars, he entered the Austrian territories, laid waste Moravia, hemmed in the imperial army, and was on the eve of gaining a complete victory when the refusal of the Turks to undergo a winter campaign defeated all his hopes. The approach of Tilly compelled him to withdraw, and he was glad to conclude a peace which deprived him of his Hungarian title, but left him in possession of his conquests. But his restless spirit would not allow him to remain at peace, and he was always engaged either in making war himself, or in stirring up others to engage in it, with a view to his own advantage. While preparing for a new war against the imperialists he was attacked with dropsy, and died in 1629 without leaving any heir to his throne. His warlike temper may be estimated from the fact that he began to carry arms at the age of seventeen, and had fought in forty-two battles.

BETHUNE, a town of France, in the department of Pas de Calais, capital of an arrondissement of the same name, 19 miles N.N.W. of Arras. It stands on a rock washed by the Brette, and is a place of considerable strength. The appearance of the town is not prepossessing. The houses are ill built and the streets are bad. There is, however, one fine square, the centre of which is occupied by an ancient belfry of remarkable construction, while the hotel-de-ville, among the best edifices in the town, forms one of its sides. The chief manufactures are oil, soap, and cloth. There are also distilleries, tanneries, and salt and sugar refineries. The trade is greatly favoured by the canals of Lawe and Bassée, which meet here and form a fine basin. The family of the lords of Bethune is very celebrated, and a branch of it was established in Scotland about the end of the twelfth century. To this branch the persecutor Cardinal Beaton belonged. Pop. 8178.

BETLIS, Bedlis, Bidlis, Bitlis, or Bittis, a town, Turkish Armenia, about 20 miles W. from Lake Van. It is one of the most ancient cities of Kurdistan, situated in a wide ravine, traversed by a stream, on whose steep banks the town is built. The houses are of red stone, generally two stories in height, with grated windows to the streets. In the centre of the town, on a high rock, is an ancient castle, formerly the residence of the khans of Betlis. The town contains several caravansaries, a number of mosques, nine churches, and three baths. The country around is fertile, well cultivated, and produces excellent crops of grain, cotton, hemp, rice, olives, tobacco of the best description, and a variety of fruits and vegetables of superior quality. The principal manufactures of the town are of coarse cotton cloth and tobacco, the greater part of the latter being sent to Erzeroom and Constantinople, where it is much esteemed. The inhabitants consist of Turks, Kurds, and Armenians. Pop. 10,000.

BETROTHMENT, a mutual promise or compact between two parties, by which they bind themselves to marry. The word imports giving one's troth, that is, true faith or promise. Formal ceremonies of betrothment are not the custom in this country as they are on the Continent, where betrothment is either solemn (made in the face of the church), or private (made before witnesses out of the church). As betrothments are contracts, they are subject to the same rules as other contracts; for instance, that they are valid only between persons whose capacity is recognized by law; and the use of fraud, violence, or intimidation vitiates the contract. The consent of both parties, of course, is required. This may be expressed either verbally, or by writing, or by action. In Germany, the consent of the parents is always necessary, if the parties are under age, not yet *sui juris*. But if the parents withhold their consent unreasonably, the permission of the judge is allowed to sanction the contract. If the opinions of the parents are diverse, the law gives effect to that of the father. Betrothments contracted thus, according to law, are called *sponsalia publica;* others are called *sponsalia clandestina*. The latter are, in some places, utterly invalid; in others, only punishable. By the common German law, however, they are valid in every case in which consummation or consecration by the priest has taken place. The parents, in these cases, are not allowed to apply for a dissolution of the contract, nor can they refuse their consent, except for highly important reasons. Public betrothment induces the obligation to marry. In case of refusal to complete the contract by marriage, the injured party is allowed an action at law to compel its performance; but, since unhappy marriages are among the greatest misfortunes, the means of compulsion applied by the law are never great, amounting only to a small fine, or a short imprisonment. If circumstances take place which, if happening before the betrothment, would have necessarily prevented it, the party affected by them is allowed to recede from the engagement, and the modern laws allow only an action for damages. In Germany, betrothment generally takes place in a small company of relations and friends. In Russia, it was once binding and indissoluble, like marriage, but is now a mere form accompanying the marriage ceremony.

BETTERTON, Thomas, a celebrated actor in the reign of Charles II., was born in Westminster in 1635, and excelled in Shakspeare's characters of Hamlet, Othello, Brutus, and Hotspur. In 1635 he opened a new play-house in Lincoln's-inn-fields, but did not succeed. He died in 1710, and was buried in Westminster Abbey. He wrote the Woman made a Justice, a comedy; the Amorous Widow, or the Wanton Wife; Diocletian, a dramatic opera, &c. The Unjust Judge, or Appius and Virginia, a tragedy, was written originally by Mr. John Webster, and altered by Betterton.

BETTINELLI, Saverio, an Italian author, born at Mantua in 1718, studied there and at Bologna under the Jesuits; entered, in 1736, the novitiate of this order, and taught, from 1739 to 1744, belles-lettres at Brescia, where he made himself known by some poems composed for the use of schools. In Bologna, where he studied theology, he continued to cultivate his poetical talents, and wrote for the theatre of the college his tragedy of Jonathan. In 1751, he was intrusted with the direction of the college of nobles at Parma. After having remained there some years, he travelled in France and Ger-

many, and returned to Italy in 1759. He now resided for a considerable time at Verona. After the suppression of the Jesuits in 1773, he returned to his native city, where he resumed his literary labours with renewed zeal. He preserved the cheerfulness and serenity of his spirit to the age of ninety years; and died in 1808, with the composure of a philosopher, and the devotion of a Christian. His chief work is his Risorgimento negli Studj, nelle Arti e ne' Costumi dopo il Mille (Bassano, 1775, 2 vols.), a superficial work, which is, however, not destitute of new and just views. The Lettere dieci di Virgilio agli Arcadi attracted great attention, and his attempted depreciation of the older poets, particularly Dante, involved him in many contests. The best of his poems are his Versi Sciolti, which, though they do not show any great poetical power, are always elegant and ingenious.

BEUTHEN, a town of Prussia, in the province of Silesia, in the government of, and 46 miles S.E. of the town of Oppeln. It contains two churches, a synagogue, a townhouse, and an hospital, and has ironworks and manufactures of linens and woollens. Pop. 17,946.

BEVERIDGE, WILLIAM, a learned divine, born at Barrow, Leicestershire, in 1638, studied at Cambridge, devoting his attention particularly to oriental literature, in which he made so much proficiency that before he was twenty he published a work on the excellence and use of the eastern tongues, especially the Hebrew, Chaldee, Syriac, Arabic, and Samaritan, accompanied with a Syriac grammar. In 1660 he took orders, and obtained the vicarage of Ealing in Middlesex, where he wrote a useful introduction to chronology. In 1672 he was appointed to the rectory of St. Peter, Cornhill, London, and shortly after published his Synodicon, in two vols. folio, containing the Apostolic Canons, the Councils received by the Greek Church, and the Canonical Epistles of the Early Fathers. This work called forth an opponent, to whom Beveridge gave a triumphant reply. While thus distinguishing himself in literature he was most assiduous in the discharge of his parochial duties, and obtained gratifying proofs of his diocesan's approbation, first by obtaining from him a prebend in St. Paul's, and next by being appointed archdeacon of Colchester. In 1684 he became prebendary of Canterbury, and in 1688 was appointed chaplain to William and Mary. Shortly after the see of Bath and Wells was offered to him; but as it had become vacant by the conscientious refusal of the excellent Bishop Ken to take the new oaths, Beveridge, to his honour, declined to accept of it. The honour, however, was only delayed, and in 1704 he became Bishop of St. Asaph, and immediately addressed a pastoral letter to his clergy, enforcing the duty of catechizing, and at the same time furnished them with a model for the performance, by printing a tract entitled the Church Catechism Explained. He died at Westminster in 1708, and left the greater part of his property to the Society for promoting Christian Knowledge and the Society for propagating the Gospel in Foreign Parts. His posthumous works, though not so learned as those published in his lifetime, are admirably adapted for popular use, and have passed through numerous editions. The two best known are Private Thoughts upon a Christian Life, and the Great Necessity and Advantage of Public Prayer and Frequent Communion.

BEVERLEY, a municipal borough, England, in the E. riding of Yorkshire, 27 miles E.S.E. from York, with 10,218 inhabitants. It stands on the E. edge of the Yorkshire wolds, and on a branch of the York and North Midland Railway, and consists of a principal street above a mile in length, and several minor streets, all spacious and tolerably well built. Its most remarkable edifice is the minster, in the decorated and perpendicular English styles, and one of the finest specimens of ecclesiastical architecture in the kingdom. Among its most important manufactures are iron castings, agricultural implements, colours, cement, leather, and beer. Its trade is chiefly in leather, corn, and wool. Its environs abound with beautiful and picturesque walks. It sent two members to Parliament till disfranchised in 1870.

BEVERLEY, JOHN OF, Archbishop of York, was born about the middle of the seventh century at Harpham in Yorkshire, studied at Oxford, became a monk, and was appointed abbot of St. Hilda. In 685 Alfred, king of Northumberland, appointed him to the see of Hexham, and two years after he became Archbishop of York. He was very learned for his age, having studied languages under Theodore, archbishop of Canterbury, and founded a college at Beverley for secular priests. He retired to this college in 717, and died in 721. Bede, who was his pupil, speaks of him with great veneration, and both he and other monks believed that he had the power of working miracles. In connection probably with this belief, his remains were dug up after the lapse of three or four centuries, and placed in a costly shrine, and so widely had his fame spread, that when William the Conqueror led his army to the north and ravaged the country, he saved the town of Beverley, from respect to the memory of the archbishop. From a similar feeling a synod held at London ordered the anniversary of his death to be celebrated as one of the festivals of the church, and numerous privileges, among others the right of sanctuary, were conferred on his college by several English sovereigns. He is said to have written an Exposition of Luke and Homilies on the Gospels.

BEWDLEY, a municipal and parliamentary borough, England, in Worcestershire, 14 miles N.N.W. Worcester, beautifully situated on the right bank of the Severn, here crossed by an elegant stone bridge. It has two or three spacious paved streets.. The houses in the principal street are in general well built and of respectable appearance. The town-hall is a neat structure of stone. There are here a free grammar-school, a blue-coat school, and several sets of alms-houses. Manufactures—comb and rope making, tanning and brassfounding; some malting is also carried on. Pop. of mun. bor., 3018; of parl. bor., 7610.

BEWICK, THOMAS, a celebrated wood-engraver, who may be said to have resuscitated the art, was born at Cherryburn, in the parish of Ovingham, Northumberland, on the 12th of August, 1753. He early showed a great talent for drawing, and was apprenticed to an engraver in Newcastle. The celebrated Dr. Hutton of Woolwich, then a schoolmaster in Newcastle, was preparing his great work on mensuration, and having employed Bewick's master in getting up the woodcuts for illustrating it, the execution of these was intrusted to the young apprentice. Bewick performed the work so admirably that his master advised him to turn his attention to wood-engraving, and accordingly with this view he proceeded to London. He returned, however, to Newcastle after a short time, and established himself there in partnership with his master. His turn of mind led him to the study of natural objects, more especially animals; and in 1790 appeared his History of Quadrupeds, the beauty of the illustrations of which attracted universal attention, so superior were they to anything hitherto produced in the art of wood-engraving. In 1797 appeared the first, and in 1804 the second volume of his British Birds, generally regarded as the finest of his works. Bewick has

never been surpassed in his spirited delineations of animals, and the admirable naturalness with which the accessories and backgrounds of the drawings, such as foliage, grass, and other rural objects, are represented. The *tail-pieces*, or appendages to chapters throughout his works, are of the highest excellence, and display often a rich vein of humour. His illustrated edition of Æsop's Fables appeared in 1818. Bewick died at his residence near the Windmill Hills, Gateshead, on the 8th November, 1828. His younger brother John was his apprentice, and gave promise of attaining equal eminence with his brother as a wood-engraver. He was cut off by consumption on the 5th December, 1795, at the untimely age of thirty-five.

BEY, among the Turks, signifies a *governor* of a town, sea-port, or small district. The Turks write the word *beg* (which see). See also BEGLERBEG.

BEYROUT, or BEIROUT (ancient *Berytus*), a sea-port of Syria, 60 miles N.W. of Damascus, with about 70,000 inhabitants, the majority of whom are Christians. In trade and commerce it holds the chief place in Syria. It stands on a tongue of land projecting into an open bay, and spreading out towards the land into a beautiful plain, backed by the mountains of Lebanon. It consists of the old town, composed generally of narrow dirty streets, the residence of the poorer classes, and the business place of the merchants; and of the new town, which stretches around it. The latter, with its modern houses, carriage roads, and gardens—its churches, colleges, schools, and hotels—has little or nothing of the oriental in its composition. Beyrout has rapidly increased since 1835, when its population was only 12,000, its rise being largely due to the extension of the silk trade, of which it is the centre. The better protection afforded both to foreigners and natives by its being the residence of the consuls-general has also contributed to its prosperity. It has extensive manufactures of silks and cottons. The imports in 1871 were valued at £1,240,000, the exports at £530,000. In ancient times it was a large and important Phœnician city, and under the Romans was long celebrated for its school of jurisprudence. The Byzantine emperor Theodosius II. raised it to the rank of a metropolis. After being destroyed by an earthquake in 551, it again rose to a considerable town in the time of the Crusades. In later times it was long in the possession of the Druses. It was bombarded and taken by the British in 1840.

BEZA (properly, *de Bèze*), THEODORE, next to Calvin, the most distinguished for genius and influence among the preachers of the Calvinistic church in the sixteenth century. Born of a noble family at Vezelay, in Burgundy, June 24, 1519; educated in Orleans under Melchior Volmar, a German philologer devoted to the Reformation; and early familiar with the ancient classical literature, he became known at the age of twenty years as a Latin poet, by his petulant and witty Juvenilia (a collection of poems of which he was afterwards ashamed). In 1539 he was made a licentiate of law, and in the same year invited by his family to Paris. He received from his uncle the reversion of his valuable abbey Froidmond, and lived on the income of two benefices and the property which he had inherited from a brother. His habits at this time were dissipated. His handsome figure, his talents, and his connection with the most distinguished families opened to him the most splendid prospects. But a clandestine marriage in 1543 recalled him from his excesses, and a dangerous illness confirmed the intention which he had formed at Orleans of devoting himself to the service of the Reformed Church; so that, after his recovery, he forsook all the advantages of his situation in Paris, and repaired with his wife to Geneva in 1547. Soon after he accepted a professorship of the Greek language at Lausanne. During the ten years of his continuance in this office he wrote a tragi-comic drama in French —the Sacrifice of Abraham—which was received with much approbation; delivered lectures (which were numerously attended) on the Epistle to the Romans and the Epistles of Peter (which served as the basis of his Latin translation of the New Testament, of which he afterwards published several editions, always with improvements); finished Marot's translation of the Psalms in French verse; and obtained to such a degree the confidence of the Swiss Calvinists that he was sent in 1558 on an embassy to the Protestant princes of Germany to obtain their intercession at the French court for the release of the Huguenots imprisoned in Paris. In the following year he went to Geneva as a preacher, and soon after became a professor of theology, and the most active assistant of Calvin, to whom he had already recommended himself by several works, in which many of the views of that eminent theologian were advocated with great zeal, and no small measure of ability, so that he was generally regarded as Calvin's ablest coadjutor, and the person destined to be his successor. His talents for negotiation were now often put in requisition by the Calvinists. He was sent to the court of Anthony, king of Navarre, at Nerac, to obtain the toleration of the French Huguenots; and at his desire he appeared, 1561, at the religious conference at Poissy, where he spoke in behalf of his party with a boldness, presence of mind, and energy which gained him the esteem of the French court. He often preached in Paris before the Queen of Navarre and the Prince of Condé; also in the suburbs. At the conference of St. Germain, in 1562, he spoke strongly against the worship of images, and after the commencement of the civil war accompanied the Prince of Condé as chaplain, and on the capture of the prince joined the Admiral Coligny. After the restoration of peace he returned to Geneva in 1563, where, besides discharging the duties of his offices, he continued to engage in theological controversies in support of the Calvinists; and after Calvin's death in 1564 became his successor, and was considered the first theologian of this church. He presided in the synods of the French Calvinists at La Rochelle (1571) and at Nismes (1572), where he opposed Morel's proposal for the alteration of clerical discipline; was sent by Condé (1574) to the court of the elector palatine; and at the religious conference at Montpellier (1586) opposed the theologians of Wurtemberg, particularly James Andreæ. At the age of sixty-nine years he married his second wife (1588), and still continued to repel, with the power of truth and wit, the attacks and calumnies which his enemies, apostatized Calvinists (such as Bolsec), Lutherans, and especially the Jesuits, heaped upon him. They reported in 1597 that he had died, and returned before his death to the Catholic faith. Beza, now seventy-eight years old, met his assailants in a poem full of youthful enthusiasm, and resisted in the same year the attempts of St. Francis de Sales to convert him, and the alluring offers of the pope. In 1600 he visited Henry IV. in the territory of Geneva, who presented him with 500 ducats. After having enjoyed excellent health during almost his whole life, he died Oct. 13, 1605, of old age. By a rigorous adherence to the principles of Calvin, in whose spirit he presided over the church of Geneva, he had become the chief of his party, and enjoyed for forty years the reputation of a patriarch, without whose approbation no important step was taken. In order to preserve the unity and permanency of his church, he readily sacrificed his own peculiar

views on minor matters, and rendered the most important services by his various erudition, his constant zeal, his active spirit, his brilliant eloquence, and even by the impression of his personal appearance, which age made still more striking. He defended his doctrines with ability and enthusiasm, and sometimes not without very great acrimony. Among his many works, his exegetic writings, and the able and correct History of Calvinism in France from 1521 to 1563, which is ascribed to him, are still much esteemed. His correspondence with Calvin is to be found in the ducal library at Gotha. A catalogue of his works is given by Anthony la Faye, who has written an account of his life; but the best life is by Schlosser.

BEZANT, round, flat pieces of pure gold, without any impression, supposed to have been the current coin of Byzantium. Bezants are frequently employed as one of the charges in heraldry, a custom supposed to have been introduced by the Crusaders. Dr. Henry in his History of England estimates its value at 9s. 4½d. sterling.

BÉZIERS, a town in the S. of France, department of Herault, 38 miles S.W. of Montpellier, with 27,722 inhabitants. It is beautifully situated on a height above the Orbe, at the termination of the Languedoc Canal, and presents a very picturesque appearance. It is surrounded by old walls, and though its streets are narrow, is tolerably well built. Its most conspicuous edifice is the cathedral, a regular Gothic structure, crowning the height on which the town stands, and possessing a fine semicircular choir surrounded by columns of red marble. Its manufactures consist chiefly of woollens, hosiery, chemicals, glass, leather, paper, soap, and casks; and it carries on an important trade in spirits, wool, grain, oil, verdigris, and fruits. In 1209 Béziers was the scene of a horrible massacre of the Albigenses. The number of victims has been stated at 60,000; but the abbot of Citeaux, who with the bishop of the district headed the murderers, apologizes in a letter to Pope Innocent III. for not having slain more than 20,000.

BEZOAR (Persian, *pazar*, a goat, or *pazachar*, against poison), a concretion or calculus, of an orbicular or oval form, met with in the stomach, gall-bladder, salivary ducts, and pineal gland, but especially in the intestines of certain animals of the order Ruminantia. Nine varieties of bezoars have been enumerated. They differ greatly in composition, but they may be divided into those which consist mainly of mineral and those which consist of organic matter. The true oriental bezoars, obtained from the gazelle, belong to the second class. When broken they have a waxy appearance, they are devoid of odour and taste, and burn away, leaving little ash. There are two kinds; one, consisting of ellagic acid, has a specific gravity 1·1; the other, of lithofellic acid, has a specific gravity 1·6, and is greener in colour. They were formerly celebrated for their supposed medicinal virtues, and distinguished by the name of the countries from which they came, or the animals in which they were found. They were considered as highly alexipharmic; so much so that other concretions, supposed to possess the same virtues, obtained the name of *bezoardics*. So efficacious were these once thought that they were eagerly bought for ten times their weight in gold. Besides being taken internally, they were worn around the neck as preservatives from contagion. For this purpose it is said that in Portugal it was customary to hire them at the price of about ten shillings per day. It is almost needless to add that the accounts of their extraordinary virtues must now be considered as totally fabulous. A strange origin was assigned to the bezoar by some of the old naturalists. The oriental stags, when oppressed with age and infirmity, were said to feed upon serpents, which restored their youthful vigour. To counteract the poison, which by this means was absorbed into their system, they plunged into some running stream, leaving their heads only above water. In this situation a viscous fluid distilled from their eyes, which was indurated by the heat of the sun, and formed the bezoar. The great value of the bezoar at one time gave birth to many imitations of it, and various tests have been proposed to detect the artificial stones. The following cruel and absurd one is given by Clusius:—Thread a needle, and draw the thread through a leaf plucked from a yew-tree; then pass the needle through a dog's foot, and leave the thread in the wound, when the dog becomes convulsed, and appears dying, mix some scrapings of bezoar with water, and moisten the animal's mouth with it; if he recover the stone is genuine.

BHAGAVAD-GÎTÂ (that is, *Revelations from the Deity*), the title of a religio-philosophical didactic poem interwoven as an episode in the great Indian epic of the Mahâbhârata. It occupies in this work a very remarkable position, being introduced at the moment when a battle is about to commence between the armies of the Kurus and their kinsmen the Pandus; and it is supposed to be recited by the deity himself, under the form of Krishna, to Arjuna, one of the Pandus, whose charioteer he is. The poem consists of eighteen books, in which are expounded, with as much clearness of thought as elegance of expression, a complete system of Indian religious philosophy. When and by whom the poem was composed cannot be determined with certainty, but it is probably to be referred to the first centuries after Christ. It enjoys a high reputation in India, many commentaries on it have been written, and it has been translated into the various modern languages of India. The best editions of the Sanskrit text are those of W. von Schlegel (2d ed. Bonn, 1846), and Thomson (Hertford, 1855). The latter also published an English translation.

BHARTRIHARI, the name of a famous Indian poet, author of a book of apothegms. According to the legend he was the brother of King Vikramâditya, who lived in the first century B.C., and he is said to have been dissolute in his youth, but to have afterwards become a hermit and devoted himself to a life of asceticism. The collection of 300 apothegms bearing his name may perhaps have been written by him, but is more probably an anthology attributed to him according to the common Indian custom, as being a personage widely known through tale and legend. These little poems present us with graceful descriptions of nature, charming pictures of love, shrewd remarks on everyday life, and profound thoughts on the deity and the immortality of the soul. Von Bohlen published an edition of Bhartrihari in 1833 (Berlin), with a successful metrical translation in 1835 (Hamburg). Bhartrihari was the first Indian writer who became known in Europe, 200 of the apothegms having been translated by the missionary Abraham Roger and published at Nürnberg in 1653.

BHAUGULPORE, or BOGLIPOOR (now more commonly called *Boglipore:* the name signifies the abode of refugees), a town, Hindoostan, capital of a district of same name, seat of a government-resident and circuit court, beautifully situated on the right bank of the Ganges, 113 miles N.W. of Moorshedabad. When viewed from a distance, its numerous mosques overtopped by lofty palms, and mingled with the hanging foliage of the tamarind-tree, give it a very pleasing appearance, but on nearer inspection it is found to be very meanly built. Besides the mosques, and the European houses, which are handsomely built, the monument of Hosein Khan is well worthy

of notice. The vicinity is healthy, fertile, and well cultivated, but is much infested by snakes, particularly the cobra di capello. Pop. chiefly Mohammedans, 30,000.

BHILSA, or BILSA, a town of Hindoostan, in Scindia's Dominions, on a trap rock, right bank Betwa, 280 miles S.W. Allahabad. It consists of a town, a fort inclosed by a ditch and by a stone wall surmounted by square towers, and a suburb which has some spacious streets lined with good houses. One of the curiosities of the place is a gun of the finest brass, measuring 19½ feet in length, with a bore of 10 inches; elegantly proportioned, highly ornamented, and said to have been made by order of the Mogul emperor Jehangir. The finest tobacco in India is produced in the vicinity of Bhilsa. On an isolated hill 4½ miles to the S.E. are some very large and remarkable ancient monuments. One of the principal is a hemisphere 70 or 80 feet in perpendicular height, constructed of thin layers of freestone uncemented. Pop. about 30,000.

BHOLAN PASS. See BOLAN PASS.

BHOPAL.—1. A native state, under British protection, in Malwah, presidency of Bengal, India, between lat. 22° 32′ and 23° 46′ N., and lon. 76° 40′ and 79° 20′ E.; bounded N., W., and S. by Scindia's Dominions. The Nerbudda forms a natural boundary through nearly the whole extent of the S. frontier; length, E. to W., 140 miles; breadth, N. to S., 81 miles; area, 6764 square miles. The country is full of jungles, and is traversed by a hilly tract, forming part of the Vindhya Mountains. The soil is fertile, yielding wheat, maize, millet, pease, and other vegetable productions peculiar to Central India. Sugar, tobacco, ginger, and cotton are the chief exports. The district is well watered by the Nerbudda, Betwa, and other minor streams. The state of Bhopal was founded by an Afghan adventurer, named Dost Mohammed Khan, who in 1723 succeeded in establishing himself here by the countenance of Aurungzebe, on whose death he assumed the title of nabob, which has been retained by his successors. Bhopal has all along been friendly in its relations with the British government. In 1818 the state was extended and placed under British protection.——2. A town, capital of above state, on the boundary between Malwah and Gundwana, 108 miles E. of Oojein. It was defended successfully in 1813 against the forces of Scindiah and the Rajah of Nagpore. East and west of the town are two large tanks, the sources of the rivers Bess and Patra.

BHURTPOOR, a native state, Hindoostan, bounded E. by Agra, S. and W. by the Rajpoot States; lat. 26° 43′ to 27° 50′ N.; lon. 76° 54′ to 77° 49′ E.; area, 1978 square miles. Soil generally light and sandy; chief productions, corn, cotton, sugar, and salt. Under British protection since 1826.

BHURTPOOR, a town, Hindoostan, capital of above state, on an extensive and fertile plain, 110 miles S.S.W. of Delhi. It covers an area about 4 miles in circuit, and was so strongly fortified that in 1805 it stood a siege by the British of fourteen weeks, and cost the besiegers 3100 men. In a second siege, in 1826, its resistance was less successful. The fortifications have been demolished, but the fort still exists, and is inclosed by a wet ditch and a wall of hewn stone, which taken together are 60 feet high. Within the fort is the rajah's palace, built of red and yellow freestone in the Mogul style, and picturesquely crowning an eminence surrounded by flower-gardens and fountains.

BIALYSTOK, or BJELOSTOK, a town, Russian Poland, province of Grodno, on the Bialy, 45 miles S.S.W. of Grodno. It is a well-built, handsome town, and has among its edifices a palace which belonged to the Counts of Braniski, and was known by the surname of the Polish Versailles. Pop. 16,985.

BIANCHINI, FRANCESCO, born at Verona, 1662, studied mathematics, physics, anatomy, and botany, at first under the Jesuits, afterwards (1680) at Padua. He was intended for the clerical profession, but repaired to Rome, and applied himself to jurisprudence, and continued the study of experimental physics, astronomy, &c., as well as of Greek, Hebrew, &c. Pope Alexander VIII. bestowed on Bianchini a rich benefice, with the appointment of tutor and librarian to his nephew, the Cardinal Pietro Ottoboni. Pope Clement XI. also patronized him, and appointed him secretary to the commission employed in the correction of the calendar. Bianchini was commissioned to draw a meridian in the church of St. Maria *degli Angeli*, and to erect a sun-dial. He successfully accomplished this difficult undertaking, with the assistance of Maraldi. Being on a tour through France, Holland, and England, he formed the idea of drawing a meridian in Italy from one sea to the other, in imitation of that which Cassini had drawn through France. He was occupied eight years at his own expense in that work; but other employments withdrew his attention from it, and it remained unfinished. He concluded his career with two important works (1727) on the planet Venus, and on the sepulchre of Augustus. He died in 1729. A monument was erected to his memory in the cathedral at Verona.

BIARRITZ, a small sea-port town in France, department Basses-Pyrénées, 4 miles from Bayonne, and 1 mile from the railway between France and Spain. Formerly a secluded watering-place, it rose into fame and fashion during the reign of Napoleon III., who chose it as the sea-side residence of the imperial family. Picturesquely situated, it is principally composed of hotels and lodging-houses. Pop. 3652.

BIAS, son of Teutamus, born at Priene, one of the principal cities of Ionia, about 570 B.C. He was a practical philosopher, studied the laws of his country, and employed his knowledge in the service of his friends; defending them in the courts of justice, or settling their disputes. He made a noble use of his wealth. His advice, that the Ionians should fly before the victorious Cyrus to Sardinia, was not followed, and the victory of the army of Cyrus confirmed the correctness of his opinion. The inhabitants of Priene, when besieged by Mazares, resolved to abandon the city with their property. On this occasion Bias replied to one of his fellow-citizens, who expressed his astonishment that he made no preparations for his departure,—'I carry everything with me.' Bias remained in his native country, where he died at a very advanced age. His countrymen buried him with splendour, and honoured his memory. Some of his sayings and precepts are preserved. He was numbered among the seven sages of Greece.

BIBERACH, a town, Würtemberg, circle Danube, on the Riss, 22 miles S.S.W. from Ulm. It is surrounded by walls, has a townhouse, five churches, numerous educational institutions, and a hospital. It carries on an active business in skin-dressing, tanning, and brewing, and in the manufacture of strong woollen fabrics. It has also a considerable trade in grain. In the vicinity is Oberholzheim, the birthplace of Wieland. The French, under Moreau, defeated the Austrians near Biberach in 1796. Pop. (1871), 7091.—Several other places in Germany have the same name.

BIBLE, a *book*, from the Greek *biblos*, which signifies the soft bark of a tree, on which the ancients wrote. The collection of the Sacred Writings, or Holy Scriptures of the Christians, is called the *Bible*, or the *Book*, by way of excellence. Some of these

writings, which are also received by the Jews as the records of their faith, are called the *Old Testament*, or *Writings of the Old Covenant*, because the Jewish religion was represented as a compact or covenant between God and the Jews, and the Greek word for covenant (*diatheke*) signifies also *last will* or *testament*. The same figure was applied to the Christian religion, which was considered as an extension of the old covenant, or a covenant between God and the whole human race. The sacred writings peculiar to the Christians are, therefore, called the *Scriptures of the New Testament*. (See TESTAMENT.) The order of the books of the Old Testament, as they are arranged in the editions of the Latin version, called the *Vulgate* (which see), according to the decree of the Council of Trent (sea. 4), is as follows:—Genesis, Exodus, Leviticus, Numbers, Deuteronomy, Joshua, Judges, and Ruth; I Samuel, or I Kings; II Samuel, or II Kings; I Kings, otherwise called III Kings; II Kings, otherwise called IV Kings; I Esdras (as it is called in the Septuagint (which see) and Vulgate), or Ezra; II Esdras, or (as we call it) Nehemiah; *Tobit, *Judith, Esther, Job, Psalms, Proverbs, Ecclesiastes, Song of Solomon, *The Book of Wisdom, *Ecclesiasticus, Isaiah, Jeremiah, and *Baruch; Ezekiel, Daniel, Hosea, Joel, Amos, Obadiah, Nahum (which, in our editions, is placed after Micah, and before Habakkuk), Jonah (which we place after Obadiah), Micah, Habakkuk, Zephaniah, Haggai, Zechariah, Malachi, *I Maccabees and *II Maccabees.[1] The books received by the Jews were divided by Ezra into three classes:—1. The Law, contained in the Pentateuch (which see), or five books of Moses. 2. The Prophets, comprising Joshua, Judges, and Ruth, I and II Samuel, I and II Kings, I and II Chronicles, Isaiah, Jeremiah and Lamentations, Ezekiel, Daniel, the twelve minor prophets, Ezra, Nehemiah, and Esther. 3. The Cetubim, or Hagiographa, that is, *holy writings*, containing the Psalms, the Proverbs, Ecclesiastes, and the Song of Solomon. These books were written in the Hebrew language, while those which are rejected from the canon as apocryphal by the Protestants, are found only in Greek or Latin.

The books of Moses were deposited, according to the Bible, after his death, in the tabernacle, near the ark: the other sacred writings, it is further said, were successively deposited in the same place, as they were written. After the building of the temple, they were removed by Solomon to that edifice: on the capture of Jerusalem by Nebuchadnezzar, the autographs probably perished, but numerous copies were preserved, as is inferred from allusions in writers subsequent to the Babylonish captivity. It is generally admitted, that the canon of the Old Testament was settled soon after the return from Babylon and the re-establishment of the Jewish religion. This work was accomplished, according to the traditions of the Jews, by Ezra, with the assistance of the great synagogue, who collected and compared as many copies as could be found. From this collation a correct edition of the whole was prepared, with the exception of the writings of Ezra, Malachi, and Nehemiah, which were added by Simon the Just. When Judas Maccabæus repaired the temple, which had been destroyed by Antiochus Epiphanes, he placed in it a correct copy of the Hebrew Scriptures, whether the autograph of Ezra or not is not known. This copy was carried to Rome by Titus. The division into chapters and verses is of modern origin. Cardinal Hugo de Sancto Caro, who flourished in the thirteenth century, having divided the Vulgate into chapters, for convenience of reference, similar divisions were made in the Hebrew text by rabbi Mordecai Nathan, in the fifteenth century. The present division into verses was made by Athias, a Jew of Amsterdam, in his edition of 1661. The punctuation is also the work of modern scholars. Biblical critics divide the Scriptures of the Old Testament into the Pentateuch, or five books of Moses; the Historical books, from Joshua to Esther inclusive; the Doctrinal or Poetical books of Job, Psalms, Proverbs, Ecclesiastes, and the Song of Solomon; the Prophetical books. The most esteemed manuscripts of the Hebrew Bible are those of the Spanish Jews. The most ancient are not more than seven or eight centuries old: the famous manuscript of the Samaritan Pentateuch, in the possession of the Samaritans of Sichem, is only 500 years old: a manuscript in the Bodleian library is thought to be 700 years old; one in the Vatican is supposed to have been written in 973. In some manuscripts, the Masora (which see) is added.

The printed editions of the Hebrew Bible are very numerous. The earliest were printed in Italy. The first edition of the entire Hebrew Bible was printed at Soncino, in 1488. The Brescian edition of 1494 was used by Luther in making his German translation. The editions of Athias, a Jew of Amsterdam, 1661 and 1667, are much esteemed for their beauty and correctness. Van der Hooght followed the latter. Doctor Kennicott did more than any one of his predecessors to settle the Hebrew text. His Hebrew Bible appeared at Oxford, in 1776–1780, two vols. folio. The text is from that of Van der Hooght, with which 630 MSS. were collated. De Rossi, who published a supplement to Kennicott's edition (Parma, 1784–99, five vols. 4to), collated 958 MSS. The German Orientalists, Gesenius, De Wette, &c., in recent times, have done very much towards correcting the Hebrew text.

The earliest and most famous version of the Old Testament is the Septuagint, or Greek translation. The Syriac version, called the *Peshito*, was made early in the second century. It is celebrated for its fidelity. The Coptic version was made from the Septuagint, some time before the seventh century. The Gothic version, by Ulphilas, was also made from the Septuagint, in the fourth century. The most important Latin version is the Vulgate. (For an account of the principal polyglots, see POLYGLOT.)

The books of the New Testament were all written in Greek, unless it be true, as some critics suppose, that the Gospel of St. Matthew was originally written in Hebrew. Most of these writings have always been received as canonical; but the Epistle to the Hebrews, ascribed to St. Paul, that of St. Jude, the second of Peter, the second and third of John, and the Apocalypse (which see), have been doubted. Eusebius distinguishes three sorts of books connected with the New Testament:—1. those which have always been unanimously received, namely, the four Gospels, the Acts of the Apostles, thirteen epistles of Paul, the first Epistle of Peter, and the first of John; 2. those which were not received, at first, by all the churches; of these, some which have been already mentioned, though at first rejected by some churches, have been since universally received; others, such as the Books of the Shepherd, the Letter of St. Barnabas, the two Epistles of St. Clement, have not been generally acknowledged as canonical; 3. books forged by heretics, to maintain their doctrines; such are the Gospels of St. Thomas, St. Peter, &c. The division of the text of the New Testament into chapters and verses was introduced earlier than that of the Old Testament; but it is not precisely known when, or by whom. (For the numerous translations of the Bible, in modern times, see the article BIBLE SOCIETIES, and

[1] Those to which an asterisk is prefixed are, by Protestants, considered apocryphal.

the annual reports of these societies, particularly of the British and Foreign Bible Society.) In Biblical criticism, the Germans have, without doubt, done more than any other nation; and we should far exceed our limits, if we were to attempt an enumeration of their works in this department. (See WETTE, GRIESBACH, GESENIUS, SCHLEIERMACHER, MICHAELIS, &c.)

Bible, English Translations of.—Among early translators of portions of the Bible into Anglo-Saxon may be enumerated Caedmon, who embodied many of the historical portions of it in alliterative metre; Adhelm, bishop of Sherborne, who translated the Psalter; Bede, the Gospel of St. John; and King Alfred, who translated chapters xx.–xxiii. of Exodus, and other portions, for the use of his family. An English version of the Bible is mentioned by Bishop Usher as supposed to have been made about 1290. Three manuscript copies of it are still in existence. Wickliffe's translation, made by the reformer in conjunction with a coadjutor, Nicholas de Hereford, was begun about 1356, and appeared in a complete form after his death, in 1388. The first printed version of the Bible in English was the translation of William Tindall, or Tyndale, one of the early martyrs to the Reformation. Before his exile from England, Tindall had revolved in his mind this work, by which he proposed that he should make 'the boy who driveth the plough to know more of the Scriptures than did all priests.' He executed it during his residence on the Continent, where his last years were spent in labours and travels connected with this enterprise. His New Testament was printed in quarto at Cologne in 1525, a small octavo edition appearing at the same time at Worms. Other editions were printed in different continental cities—Hamburg, Antwerp, Strasburg, Nürnberg, &c.—at different dates. Tonstall, bishop of London, caused the first edition to be bought up and burned both in England and on the Continent. He declared that it contained more than 2000 errors. The Pentateuch was published by Tindall in 1530. He also translated some of the prophetical books. His translation was superior to all previous versions in purity, perspicuity, and accuracy, and it formed the basis of all subsequent translations, particularly of the Authorized Version. A translation of the entire Bible was published by Miles Coverdale in 1535. It was undertaken at the instance of Cromwell in opposition to Tindall's translation, and being made, not from the originals, but from German and Latin versions, was inferior to Tindall's. After the death of Tindall, John Rogers, who was afterwards the first martyr in the reign of Queen Mary, undertook the completion of his translation of the Old Testament, and the preparation of a new edition. In this edition the latter part of the Old Testament (after 2 Chronicles) was based on Coverdale's version. It was dedicated to Henry VIII., under the assumed name of Thomas Matthew, and through the influence of Archbishop Cranmer was permitted to be published in England. This permission, however, seems to have come late, as it was printed abroad as far as Isaiah. A revised edition was published in 1539, under the superintendence of Richard Taverner. Tindall's and Matthew's versions were both accompanied by polemical notes. In the same year as Taverner's another edition appeared, printed by authority, with an engraving, said to be by Holbein, on the title-page, in costly type, and forming a sumptuous folio, with a preface by Cranmer, and hence called Cranmer's Bible. This was the first Bible printed by authority in England, and a royal proclamation in 1540 ordered a copy of it to be placed in every parish church. This continued, with various revisions, to be the authorized version till 1568. In 1557 an edition appeared at Geneva, beginning with the New Testament, based on Tindall's, and completing the entire Bible in three years. This was the work of Whittington, Coverdale, Goodman, John Knox, and other exiles. It was accompanied by notes of a Calvinistic tendency. It was commonly called the Geneva Bible, but became even better known by another title, the Breeches Bible, from its rendering of the last clause of Genesis iii. 7: 'They sewed fig-tree leaves together and made themselves breeches.' This version was generally adopted by the Puritan party, and was for sixty years the most popular in England. It was allowed to be printed in England under a patent of monopoly in 1561. It was the first printed in Roman letters, instead of the old black letter, which reduced its bulk and price. It was also the first to adopt the plan previously adopted in the Hebrew, of a division into verses. It omitted the Apocrypha, left the authorship of the epistle to the Hebrews open, and put words not in the original in italics.

The Bishops' Bible, published 1568 to 1572, was based on Cranmer's, and revised by Archbishop Parker and eight bishops. It succeeded Cranmer's as the authorized version, and was rendered as attractive as profuse illustration and expensive getting up could render it, but this made it inaccessible to the people, and it did not commend itself much to scholars. In 1582 an edition of the New Testament, translated from the Latin Vulgate, appeared at Rheims, and in 1609 to 1610 the Old Testament, with notes, was published at Douay. This is commonly called the Douay Bible, and is the version recognized by the Roman Catholic Church. It professed to be based on a greater respect for the Septuagint, the Vulgate, and other ancient translations, than the previous English versions, and was accompanied by notes as dogmatic as those of the Geneva Bible. In one respect it was markedly deficient, in purity of English diction.

In the reign of James I. a Hebrew scholar, Hugh Broughton, insisted on the necessity of a new translation, and at the Hampton Court Conference the suggestion was made by Dr. Rainolds of Oxford, as spokesman of the Puritan representatives, and accepted by the king. The work was committed to fifty-four scholars, but only forty-seven took part in it. They were divided into six companies, who had their respective tasks assigned them, and met apart. The revision was begun in 1607, and occupied three years. The whole work was revised by twelve of the translators, two out of each company, and a final revision was made by Dr. Myles Smith, the writer of the preface, and Dr. Bilson, bishop of Winchester. The completed work was published in a folio volume in 1611. The translators were enjoined to follow the ordinary Bible read in the churches commonly called the Bishops' Bible, and not to make alterations unless the meaning of the original could be more accurately conveyed. The general accuracy of this translation, and the purity of its style, have so won the approbation of scholars, and commended it to readers generally, that from the time of its adoption it has superseded all other versions. This general adoption, however, which no previous authorized version had succeeded in obtaining, though evidently resting more on its own merits than on official sanction, has probably had an injurious effect on the critical study of the Bible in this country, which the continued use of a variety of versions must have tended to foster. Of late years this disadvantage of uniformity has begun to be felt, and has taken the form of a general demand for a revision of the Authorized Version. This task has recently

been undertaken by a number of the Anglican clergy, with the aid of associates from various other bodies. The first volume of the new version appeared in 1871. (For an account of the German translation, see LUTHER.)

Bible, Geography of, describes Palestine, and gives an account of the Asiatic countries bordering on Palestine, and of the provinces of the Roman Empire into which Christianity was introduced during the age of the apostles. The sources of this science are the Scriptures, the writings of Josephus, the geographical authors of antiquity,—Strabo, Ptolemy, and Pomponius Mela,—and the Onomasticon Urbium et Locorum Scripturæ Sacræ, written by Eusebius, bishop of Cæsarea, in the fourth century, in Greek, and translated by Jerome into Latin. Among the learned moderns who have cultivated this science, so important for the interpreter of the Holy Scriptures, are Reland, Wells, and the Dutchman Ysbrand of Hamelsfeld.

BIBLE SOCIETIES. A clergyman of Wales, whom the want of a Welsh Bible led to London, occasioned the establishment of the British and Foreign Bible Society, which was founded in London, March 7, 1804. It was called the Bible Society, because its object was the distribution of the Bible; British, because its operations were first directed towards the poor of Great Britain; and Foreign, because it proposed, as far as its means would permit, to send Bibles, in all languages, to all parts of the world. The Bibles distributed by the society were to be without additions and explanations, in order to give them a more universal circulation. In the same year the first general meeting was held in London, which unanimously adopted the proposed plan. Lord Teignmouth was chosen president, and many bishops, lords, and members of Parliament accepted the office of vice-president. In 1815, 484 similar institutions had been formed in all parts of Great Britain, and connected with the former as a parent society, to support it with pecuniary contributions, and to receive, in return, a supply of Bibles. In Germany, Switzerland, Holland, Russia, Sweden, Denmark, America, similar Bible societies have been formed, and are connected with the British.

The sixty-eighth annual report of the British and Foreign Bible Society in London gives a summary of its operations from its commencement in 1804, since when it has circulated 255 versions of the whole or parts of the Scriptures in 202 different languages, including English, Welsh, Gaelic, Irish, Manks, French, Basque, Breton, Flemish, Spanish, Portuguese, Italian, Dutch, Danish, Hebrew, Swedish, German, Polish, Greek (ancient and modern), Armenian (ancient and modern), Arabic, Coptic, Indo-Portuguese, Syriac, Carshun, Esquimaux, Mohawk, Ethiopic, Malay, Turkish, Hindostanee, Greenlandish, Amharic, Persian, Bohemian, Latin, Albanian, numerous languages and dialects of the nations of Middle and Eastern Asia, the Levant, North Africa, &c., the principal languages of Polynesia, South Africa, West and East Africa, North America, &c. The society has in Great Britain and Ireland: auxiliaries, 824; branches, 386; associations, 3150—total, 4360. In Europe and the colonies it has: auxiliaries, 97; branches, 983—total, 1080. The following are the total issues of Bibles, or Portions, by the society's European agencies, from the commencement of each:—Paris, from 1820, 5,479,420; Brussels, 1835, 395,155; Amsterdam, 805,071; Berlin, 1853, 2,405,029; Cologne, 1847, 2,199,898; Frankfort, 1830, 3.488,533; Vienna, 834,583; Lisbon, 1864, 50,597; Stockholm, 1832, 1,943,006; Norway, 1832, 387,116; Copenhagen, 1855, 244,756; St. Petersburg, 1828, 1,010,447; Odessa, 1868, 52,307; Leghorn, 1860, 382,961; Madrid, 1868, 303,413; to Prussian troops, since 1830, 643,935—total, 20,631,227. In British India (associated societies):—Calcutta, from 1811, 1,344,477; Allahabad, 1845, 265,914; Madras, 1820, 2,180,078; Bombay, 1813, 358,609; Colombo, 1812, 116,249; Jaffna, 1835, 132,134; Serampore, 200,000—total, 4,597,461. Foreign societies, assisted by the British and Foreign Bible Society, have circulated in Europe up to 1872, 12,306,825; in America, 29,197,448. The total issues by the society, both at home and abroad, from 17th September, 1805, are 65,884,095. The total expenditure in sixty-eight years has been £7,099,175, 5*s*. 11*d*.; total revenue from usual sources in 1872, £183,944, 17*s*. 8*d*.

The proceedings of the British and Foreign Bible Society have given rise to several controversies, one of which related to the neglecting to give the prayer-book with the Bible; a neglect against which strong remonstrances were published by several divines of the Church of England, and especially by Bishop Marsh, who also published in 1812, A History of the Translations which have been made of the Scriptures, from the Earliest to the Present Age, throughout Europe, Asia, Africa, and America; composed chiefly with the view of ascertaining in how many new languages the British and Foreign Bible Society has been the means of preaching the gospel. This pamphlet was intended as an answer to a statement of Mr. Vansittart, that the society, besides reprinting many translations, had published the Scriptures in twenty-five languages into which they were not known to have been before translated. Dr. Marsh maintained that the society had not translated so much as even the four Gospels into any one language into which they had not been previously translated, and that though they had translated a single Gospel into two languages (the *Bugis* and the *Macassar*), into which no part of Scripture had been previously translated, they had not then printed even one entire Gospel into any one language into which translations of portions of the Scripture had not been executed either before the existence of the society, or independently of its assistance. Another controversy, in which the supporters of the society have been involved, related to the circulation of the Apocrypha along with the canonical books. Their most distinguished antagonist on this question was the late Dr. Andrew Thomson, one of the ministers of Edinburgh. A third controversy has been occasioned by the alleged inaccuracy of some of the translations executed under the authority of the society, such as the Turkish New Testament, printed at Paris in 1819; and a fourth, on the admissibility of Anti-trinitarians to the privilege of membership, threatened for some time to give rise to dissensions in the society.

The Edinburgh Bible Society was established in 1809, and up to 1826 was connected with the British and Foreign Bible Society. It then seceded on the occasion of the controversy regarding the circulation of the Apocrypha, and up to 1860 existed as a separate society, consisting of all persons disposed to promote the circulation of the Scriptures, being Protestants, and professing their belief in the doctrine of the Holy Trinity. Its resources were from subscriptions, collections, and the contributions of nearly one hundred associations in different parts of Scotland. Its average annual expenditure was about £3000, and its issue of Bibles about 35,000, a large proportion of which were Gaelic. In 1861 this society was united with the National, the Glasgow, and other Bible Societies, into a whole called the National Bible Society of Scotland, having its headquarters in Edinburgh and Glasgow. The object of

the society is to promote the diffusion of the Scriptures at home and abroad without note or comment, and without the Apocrypha, and it is independent of all other Bible societies. By the abstract report for 1872 it appears that since the union of the societies in 1861 the total revenue has been £176,554, and the total circulation of Bibles and portions of Scripture 3,103,456. The society has nearly 200 auxiliaries, and circulates the Scriptures in Great Britain and colonies, on the Continent, and in China, Japan, &c. The Hibernian Bible Society in 1867 had an income of £4304, and issued 63,718 volumes.

The Edinburgh Bible Society, with some others in Scotland, was for a considerable period engaged in a lawsuit with the royal printers for Scotland, who insisted on preventing the importation of Bibles printed beyond the bounds of Scotland. Though the patentees were successful in obtaining an interdict against importation, the result of the action has ultimately proved favourable to the public. In a memorial on the case of the Bible societies, printed in 1824, many inaccuracies in the common editions of the Bible were complained of, and in several other respects the Bibles printed in Scotland were alleged to be inferior to some of the English editions. It cannot be denied that a manifest improvement in the appearance of the Edinburgh editions subsequently took place; but the argument of those who defended the society went deeper, and completely proved that the monopoly which the king's printers enjoyed, however it might enrich them, was erroneous in principle and injurious to the public. It has accordingly been abolished.

The number of Bible societies throughout the world cannot be very accurately ascertained; but the following approximate estimate has been made for 1868:—In Great Britain, 746 auxiliaries, 400 branch societies, and 2987 associations; in the colonies, 130 auxiliaries, 943 branches, and 200 associations; in Ireland there are 508; in foreign countries there are about 65 societies, many of which have auxiliaries and branches. This estimate, however, applies only to societies which are more or less connected with the British and Foreign Bible Society, and as there are many societies not so connected, the estimate necessarily falls far short of the truth. Up to 1868 the British and Foreign Bible Society had promoted the translation, printing, and circulation of the Scriptures in 182 languages, of which more than 100 had not been before reduced to print, and many had previously no written character at all.

In Germany the principal Bible societies are the Prussian, which was established at Berlin in 1805, and has issued up to 1872, 2,053,174 copies: the Wurtemberg, instituted in 1812, with auxiliaries—total issue, 1,163,026; the Saxon, instituted 1814—total issue, 438,640; the Hanover, instituted 1814—total issue, 130,000; the Hamburg, instituted 1814—total issue, 150,000; the Frankfort, instituted 1816, 75,000; the Bavarian Protestant, instituted at Nürnberg in 1821—total issue, 296,692. The other principal German Bible societies are those of Sleswick-Holstein, Hesse-Darmstadt, Hesse-Cassel, Baden, Bremen, Lubeck, Rostock, &c. France has two principal Bible societies, whose head-quarters are at Paris, the one instituted in 1818, with a total issue of 514,518, and the other in 1833, with a total issue of 750,000. There is also one at Strasburg, with a total issue (chiefly Bibles and Testaments) of 99,689. Switzerland possesses various Bible societies, among which those of Geneva and Zurich may be particularly mentioned. Sweden and Denmark have also greatly distinguished themselves in this cause, the former having, since the institution of the Swedish Bible Society in 1808, issued 845,190, and the latter, since its institution in 1814, issued 321,692. The Russian society in St. Petersburg vied with the British, and some years since had printed the Bible in thirty-one languages and dialects spoken in the Russian dominions, among which is one in the modern Russian, since the translation of the church is in the Slavonic, and unintelligible to laymen. This new translation was joyfully received by the country people, and showed them the errors and superstitions which disfigure the ritual of the Greek Church. Part of the clergy are opposed to the distribution of the Bible, and persecutions against zealous readers of the sacred book took place in the more distant governments. The Gospels in the Calmuc language and the Persian New Testament were much sought for. A translation of the Bible for the Buriats, Mongol worshippers of the Lama, near Lake Baikal, was prepared, with the assistance of two young Buriats of high birth, who embraced Christianity at Petersburg. Auxiliary societies were formed at Irkutsk, Tobolsk, among the Kirghises, Georgians, and Cossacks of the Don. The Russian societies, from which so much good was anticipated, were suppressed by an imperial ukase in 1826, at which period their total issue of the Scriptures had been 861,105. The bull of Pius VII., June 28, 1816, obtained by the Archbishop of Gnesen, did not prevent the Poles from forming a society in Warsaw, under the protection of Alexander. In 1817 the distribution of the Bible by such societies was forbidden in Austria, and those already existing in Hungary were suppressed. Italy, Spain, and Portugal have had as yet no Bible societies; but the British have provided them with Bibles in their own tongues. In the United States of America, the great American Bible Society, formed in 1816, acts in concert with the auxiliary societies in all parts of the Union. The management of the society is intrusted to a board of managers; stereotype plates have been procured, and Bibles are issued at a low price for the auxiliaries, and for gratuitous distribution among the poor. During the first year 6410 copies of Bibles and Testaments were distributed. In 1827 the number amounted to 146,000; in 1840–41 to 152,202; and in 1853–54 to 815,399. The whole number issued since the organization of the society up to 1872 was 27,680,098. These have been mostly in English, Spanish, and French, from the society's plates. The managers have occasionally purchased Bibles in Europe, and issued them to applicants, in German, Dutch, Welsh, Gaelic, Portuguese, modern Greek, and some other European languages. They have also furnished money to print translations into pagan languages, by American missionaries. Many of the auxiliary societies have undertaken to discover the number of families in their vicinity destitute of the Bible, and to supply them. It is the object of the society to supply every family in the United States before devoting much attention to distribution abroad. Yet Spanish America and Ceylon, Greece, and the Sandwich Islands have been furnished with Bibles by the society. The colonies also exert themselves in this cause. Hayti has offered her assistance, and even the Esquimaux already read the Acts of the Apostles in their own language. A similar zeal for the distribution of the Bible has been awakened in Southern Africa and in India, where Bibles are published in the languages of the country: even the islands on the eastern coast of Asia are not neglected. In the Netherlands there is a fraternal union of different sects for this purpose, and the issue of the Netherlands Bible Society from 1815 amounts to 1,160,475. Such associations excite among different sects a feeling of mutual sympathy, by a consideration of their mutual participation in the most important truths of Christianity. The total issue of the Scriptures by these

and other societies in the Continent and America is given in the abstract of the British and Foreign Bible Society's report, contained in a previous page of this article.

Such a general diffusion of the Bible is an event of great historical importance. Its translation into languages which have been hitherto destitute of all literature, and even of writing, must contribute greatly to the progress of intellectual cultivation throughout the earth, and must have an especial influence on the advancement of general philology. The Bible societies may be considered as assisting to pave the way for the introduction of European civilization into all the less enlightened regions of the earth. The societies adhere to the principle of publishing the Bible without notes, starting from the Protestant principle that the Bible, and the Bible alone, is the foundation of the Christian faith. Undoubtedly the various sects of Christians, differing so greatly as they do, and always must, respecting certain points of faith, and the interpretation of particular passages of the Scriptures, could not be made to co-operate with zeal in the distribution of the Bible, if the text were accompanied with commentaries. But now missionaries and ministers must supply, by verbal explanation, the place of notes, because it is clear to everybody that the Bible cannot be understood without the explanation afforded by study. Thus the opinions of individuals, orally delivered, are substituted for the more precise and profound criticism of united commentators.

BIBLICAL ARCHÆOLOGY is the science which describes the political state, manners, and customs of the Jewish nation, as well as the usages of the early Christian church; consequently, the antiquities of the Bible. Civil relations, religious ceremonies, holy places, domestic customs and utensils, modes of dress, and other external circumstances, form the subject of this science. The antiquities of the Bible are partly Jewish, partly Christian. The sources of the former are the Old Testament, the works of Josephus and Philo, the Talmud, and the writings of the rabbins. The sources of Christian antiquities are the New Testament and the writings of the fathers, who lived and wrote soon after the age of the apostles. Without the knowledge of the manners and customs of a nation many passages of their authors, which contain allusions to them, remain unintelligible, and on this account the knowledge of the antiquities of the Bible is necessary to the interpreter of the Holy Scriptures. Among the older authors who have written on Jewish antiquities Bauer, Warnekros, De Wette, Rosenmüller, and Jahn particularly deserve to be mentioned; among recent writers, such as Viner, Ewald, and Keil. A great deal of information on the same subject may be found in such works as Smith's, Fairbairn's (Blackie & Son), or Kitto's Bible Dictionaries, and also in many commentaries on the Scriptures.

BIBLIOGRAPHY (from *biblion*, a book, and *grapho*, I describe) was originally a branch of *archæography*, or the art of describing or explaining antiquities, and denoted skill in the perusing and judging of ancient manuscripts; but in its modern and more extended sense it signifies the knowledge of books, in reference to the subjects discussed in them, their different degrees of rarity, curiosity, reputed and real value, the materials of which they are composed, and the rank which they ought to hold in the classification of a library. It is therefore divided into two branches, the first of which has reference to the contents of books, and may be called, for want of a better phrase, *intellectual* bibliography; the second treats of their external character, the history of particular copies, &c., and may be termed *material* bibliography. The object of the first kind is to acquaint literary men with the most valuable books in every department of study, either by means of *catalogues raisonnés* simply, or by similar catalogues accompanied with critical remarks.

Bibliography belongs to those sciences the progress of which is dependent, in a great degree, on external circumstances. It has been, and still is, cultivated most successfully in France. This is owing not only to the riches of the great and daily increasing public libraries, liberally thrown open to the use of the public, the large number of fine private collections, and the familiarity of its numerous literary men with books of all ages and countries, but in a great degree to the practical spirit of the nation, which induces their bibliographers to keep constantly in view the supply of existing wants. Brunet's Manuel du Libraire was the first important work which contained, in an alphabetical form, a list of the most valuable and costly books of all literatures; Barbier's Dictionnaire des Ouvrages Anonymes, the first systematic and satisfactory treatise on this subject; Renouard's Catalogue d'un Amateur, the first, and for a long time the best guide of the French collectors; the Bibliographie de la France, the first work which showed how the yearly accumulation of literary works can be recorded in the most authentic manner. No less valuable are the works of Peignot, Petit Radel, Renouard on the Aldines (see ALDINE EDITIONS), and many others. Among more recent French works may be cited Bibliographie de la France, a periodical publication commenced in Paris in 1810. H. Bossange, Ma Bibliothèque Française (Paris, post 8vo, 1855), gives a list of standard editions of the best French authors. I. M. Quérard, La France Littéraire ou Dictionnaire Bibliographique, an account of the literature of the eighteenth and nineteenth centuries (ten vols. 8vo, Paris, 1827–39); Quérard, La Littérature Française Contemporaine (1827–49); Brunet's Manuel du Libraire (new edition, six vols. 8vo, Paris, 1860–65); E. Hatin, Bibliographie de la Presse Périodique Française (one vol. 8vo, Paris, 1866).

In England, although it contains many rich public and private collections, bibliography has not been so successfully cultivated as in France. The most extensive catalogues of books which it can boast of are those of the Bodleian Library, the British Museum, the Advocates' Library, Edinburgh (compiled partly by Ruddiman), the Harleian Library (compiled partly by Dr. Johnson), and Sir Joseph Banks' Library (compiled by Dr. Dryander). None of these catalogues pretend to much more than a bare list of the titles of books, alphabetically arranged under the authors' names. Catalogues compiled on a scientific system, by which the reader is assisted in his researches after books on a particular subject, are not uncommon on the Continent; but the only extensive one of the kind in this country to which we can refer is that of the Library of the Writers to the Signet, Edinburgh. The most splendid catalogue perhaps ever published is that of the Earl of Spencer's Library, compiled by Dibdin, in four large volumes, with numerous engravings. Of English bibliographical works we may mention the Typographical Antiquities of Ames, Herbert, and Dibdin; Dr. Adam Clarke's Bibliographical Dictionary and Miscellany (1803–6, eight vols.), an undigested and incorrect work; Dr. Harwood's View of the Various Editions of the Greek and Roman Classics; Dibdin's Introduction to the Knowledge of Rare and Valuable Editions of the Classics (latest edition, 1827, two vols.); Brydges' Censura Literaria (1805), and British Bibliographer (1818); Beloe's Anecdotes of Literature (1807), a silly compilation; Savage's Librarian

(1808); Dibdin's Bibliographical Decameron (1817), and Tour in France and Germany (1821); Horne's Introduction to the Study of Bibliography (1814); Dr. Robert Watt's Bibliotheca Britannica (1819, four vols. 4to), a work of stupendous labour and great utility; Moss's Manual of Classical Bibliography (1825); A Bibliographical and Critical Account of the Rarest Books in the English Language, by J. Payne Collier, F.S.A. (two vols. 8vo, London, 1865); Lowndes' Bibliographer's Manual, edited by H. G. Bohn (London, 1869, six vols.); S. A. Allibone's Critical Dictionary of English Literature and British and American Authors (Philadelphia, 1859–71, three vols.), &c. We may also refer to Ottley's Inquiry into the Origin and Early History of Engraving (1816).

American literature, although of comparatively recent origin, has already given rise to a pretty extensive series of bibliographical works on both sides of the Atlantic. We may cite—Bibliographical Catalogue of Books, Translations of the Scriptures, and other publications in the Indian Tongues of the United States (8vo, Washington, 1849); Duyckinck's Cyclopedia of American Literature (two vols. royal 8vo, New York, 1856); Ternaux-Compans, Bibliothèque Américaine (8vo, Paris, 1837); Trübner's Bibliographical Guide to American Literature (London, 1856).

The learned Germans, little assisted by public and almost entirely destitute of private collections, consulting only the real wants of the science, have actively endeavoured to promote it. Ersch is the founder of German bibliography. He gave it a truly scientific character by his extensive work, Allgemeines Repertorium der Literatur (Universal Repertory of Literature, 1793–1807), and by his Handbuch der Deutschen Literatur (Manual of German Literature). German bibliography is particularly rich in the literature of separate sciences; and the bibliography of the Greek and Latin literature, as well as the branch which treats of ancient editions, was founded by the Germans. The first attempt, in Germany, to prepare a universal bibliographical work was made by Ebert. The following are valuable German bibliographical works in particular departments of science and literature:—T. A. Nosselt's Anweisung zur Kenntniss der Besten Allgemeinen Bücher in der Theologie (fourth edition, Leipzig, 1800), and the continuation of it by Simon (Leipzig, 1813); C. F. Burdach's Literatur der Heilwissenschaft (Gotha, 1810, two vols.); W. Gf. Ploucquet's Literatura Medica (Tübingen, 1808, four vols. 4to); T. G. Meusel's Bibliotheca Historica (Leipzig, 1782–1802, eleven vols. in twenty-two vols., not finished); his Literatur der Statistik (Leipzig, 1816, two vols.); G. R. Böhmer's Bibliotheca Scriptorum Historiæ Naturalis (Leipzig, 1785–99, seven vols.); Alb. Haller's Bibliotheca Botanica (Zurich, 1771, two vols. 4to); Anatomica (Zurich, 1774, two vols. 4to); Chirurgica (Bern, 1774, two vols. 4to); and Medicinæ Practicæ (Bern, 1776, et seq., four vols. 4to), &c.; R. Buckner's Bibliographisches Handbuch der Deutschen Dramatischen Literatur (4to, Berlin, 1837); W. Engelmann's Bibliotheca Geographica (two vols. 8vo, Leipzig, 1858), a classified catalogue of all works in geography and travels published in Germany from the middle of the fourteenth century down to 1856, with prices, index, &c.; W. Engelmann's Bibliotheca Philologica (third edition, 8vo, Leipzig, 1853) contains a list of Greek and Latin grammars, from 1750 to 1852: the same writer has published bibliographical works on mechanical technology, medicine, economy, veterinary art, geography, zoology, palæontology, &c.; W. Heinsius' Allgemeines Bücherlexicon, with five supplements (thirteen vols. 4to, Leipzig, 1812–49), an alphabetical catalogue of all the books published in Germany from 1700 to 1846, with sizes, prices, and publishers' names; Dr. Julius Petzholdt's Bibliotheca Bibliographica (one vol. small 4to, Leipzig, 1866).

Directions for the study of bibliography are contained in Achard's Cours Élémentaire de Bibliographie (1807, three vols.), Th. Hartwell Horne's Introduction to the Study of Bibliography (1814, two vols.), and Gabr. Peignot's Dictionnaire Raisonné de Bibliologie (1802–4, three vols.)

Material Bibliography, often called by way of eminence, *bibliography*, considers books in regard to their exterior, their history, &c., and has been principally cultivated in France and England. The different branches of material bibliography (see also BIBLIOMANIA) may here be mentioned:—the knowledge of the ancient editions (*incunabula*, or, if classical authors, *editiones principes*), some of the best works on which are G. Wfg. Panzer's Annales Typographici (Nürnberg, 1793–1803, eleven vols. 4to), coming down to 1536; the Annales Typographici, by Maittaire (Hague, 1719, et seq., eleven vols. 4to), which not only contains the titles, but investigates the subjects of works. More exact descriptions of particular ancient editions are found in Serna Santander's Dictionn. Bibliogr. du 15ième Siècle (Brussels, 1805, three vols.); Fossius' Catalogus Codicum, sec. 15, Impressor. Bibliothecæ Magliabecchianæ (Florence, 1793, three vols. fol.), and others. The study of rare books, on account of the vague principles on which it rests, is more difficult than is generally believed, and easily degenerates into superficial and capricious trifling. This has been more injured than promoted by I. Vogt's Catalogus Librorum Rariorum (Frankfort and Leipzig, 1793), and J. Jac. Bauer's Bibliotheca Librar. Rarior. Universalis (Nürnberg, 1770–91, twelve vols.) We may also mention here the catalogues of the books prohibited by the Roman Church (Indices Librorum Prohibitorum et Expurgatorum). For the discovery of the authors of anonymous and pseudonymous works, we may use Barbier's Dictionnaire des Ouvrages Anonymes et Pseudonymes (Paris, 1806–9, four vols.), which is valuable for its accuracy (but it contains only French and Latin works); Quérard's Dictionnaire des Ouvrages polyonymes et anonymes de la Littérature française (Paris, 1854–56), and his Supercheries littéraires dévoilées (five vols. Paris, 1845–56). We need not observe what an important source of information in the department of bibliography are literary journals. See BIBLIOMANIA.

BIBLIOMANCY, divination performed by means of the Bible, also called *sortes biblicæ*, or *sortes sanctorum*. It consisted in taking passages at hazard, and drawing indications thence concerning things future. It was much used at the consecration of bishops. It was a practice adopted from the heathens, who drew the same kind of prognostications from the works of Homer and Virgil. In 465 the Council of Vannes condemned all who practised this art to be cast out of the communion of the church; as did the Councils of Agde and Auxerre. But in the twelfth century we find it employed as a mode of detecting heretics. In the Gallican Church it was long practised in the election of bishops; children being employed, on behalf of each candidate, to draw slips of paper with texts on them, and that which was thought most favourable decided the choice. A similar mode was pursued at the installation of abbots and the reception of canons; and this custom is said to have continued in the cathedrals of Ypres, St. Omer, and Boulogne, as late as the year 1744. In the Greek Church we read of the prevalence of this custom as early as the consecration of Athana-

sius, on whose behalf the presiding prelate, Caracalla, archbishop of Nicomedia, opened the Gospels at the words, 'For the devil and his angels' (Mat. xxv. 41). The Bishop of Nice first saw them, and adroitly turned over the leaf to another verse, which was instantly read aloud: 'The birds of the air came and lodged in the branches thereof' (Mat. xiii. 32). But this passage appearing irrelevant to the ceremony, the first became gradually known, and the Church of Constantinople was violently agitated by the most fatal divisions during the patriarchate.

BIBLIOMANIA ('book-madness'), a word formed from the Greek, and signifying a passion for possessing curious books. The true bibliomanist is determined in the purchase of books, less by the value of their contents, than by certain accidental circumstances attending them. To be valuable in his eyes, they must belong to particular classes, be made of singular materials, or have something remarkable in their history. Some books acquire the character of belonging to particular classes, from treating of a particular subject of interest to the bibliomanist; others from something peculiar in their mechanical execution, or from the circumstance of having issued from a press of uncommon eminence, or because they once belonged to the library of an eminent man. Some of these collections are of much intrinsic value. Among them are various editions of the Bible (the most complete is at Stuttgart); collections of editions of single classics (for example, those of Horace and Cicero in the city library at Leipzig); the editions *in usum Delphini* and *cum notis variorum;* the editions of Italian classics printed by the Academy *della Crusca;* works printed by the Elzevirs, by Aldus, Comino in Padua, and Bodoni (the most complete collection of Bodoni's editions is in the library of the Duchess d'Abrantes); the classics edited by Maittaire, Foulis, Barbou, Brindley, and others; and the celebrated Bipont editions, with others. It was more customary in former times than at present to make collections of books which have something remarkable in their history, for example, books which have become very scarce, and such as have been prohibited. Of the first sort, the collections of Engel and Salthon were formerly among the most considerable. The one at Dresden is among the largest now existing. Books distinguished for remarkable mutilations have also been eagerly sought for. Those which appeared in the infancy of typography, called *incunabula*, from the Latin *cunæ*, a cradle, principally the first editions (*editiones principes*) of the ancient classics, are still in general request. Much of the value of a book, in the eyes of a bibliomanist, depends upon the material of which it is composed. An enormous price is frequently given for splendid proof impressions of copperplate engravings, and for coloured impressions, for works adorned with miniatures and illuminated initial letters; likewise for such as are printed upon vellum. Works printed upon paper of uncommon materials, or various substitutes for paper (for example, E. Bruckmann's Natural History of Asbestos, upon paper made of asbestos, Brunswick, 1727, 4to), have been much sought after; likewise those printed upon coloured paper. In Italy the colour of books of this sort is commonly blue; in France, rose colour; in some ancient German books the colour is yellow; sometimes, though rarely, green. A list of books of this class is to be found in Peignot's Repertoire des Bibliographies speciales (Paris, 1810).

Other books in high esteem among bibliomanists are those which are printed on large paper, with very wide margins. True bibliomanists often measure the margin by inches and lines. In English advertisements of rare books some one is often mentioned as particularly valuable on account of its being 'a tall copy.' If the leaves happen to be uncut, the value of the copy is much enhanced. Other works highly valued by bibliomanists, are those which are printed with letters of gold or silver, or ink of singular colour; for example, (1) Fasti Napoleonei (Paris, 1804, 4to), a copy on blue vellum paper, with golden letters; (2) Magna Charta (London, Whitaker, 1816, folio), three copies upon purple-coloured vellum, with golden letters; also books printed from copperplates. Catalogues of these have been made by Peignot and others.

In France and England the bibliomania often extends to the binding. In France the bindings of Derome and Bozerian are most valued; in England those of Charles Lewis and Roger Payne, several specimens of whose skill are to be seen in the library of Lord Spencer; among others the Glasgow edition of Æschylus, 1795, the binding of which cost £16, 7*s.* sterling. Payne is said to have sometimes received from twenty to thirty guineas for binding a single volume. This species of luxury is carried to such a height in London, that a copy of Macklin's Bible (four vols. folio), in red or blue morocco leather, sold for seventy-five guineas, and Boydell's large edition of Shakspeare (nine vols. with large engravings) £132 sterling. Even the edges of books are often adorned with fine paintings. Many devices have been adopted to give a factitious value to bindings. Jeffery, a London bookseller, had Fox's History of King James II. bound in fox-skin, in allusion to the name of the author; and the famous English bibliomanist Askew even had a book bound in human skin. In the library of the castle of Königsberg are twenty books bound in silver (commonly called the *silver library*). These are richly adorned with large and beautifully engraved gold plates, in the middle and on the corners. To the exterior decorations of books belongs the bordering of the pages with single or double lines, drawn with the pen (*exemplaire réglé*), commonly of red colour—a custom which we find adopted in the early age of printing, in the works printed by Stephens. The custom of colouring engravings has been dropped, except in cases where the subject particularly requires it (for instance, in works on natural history, or the costumes of different nations), because the colours conceal the delicacy of the engraving. On this account the coloured copies of Durer's woodcuts are esteemed less than those which are left uncoloured.

The other means of idle competition being almost all exhausted, a new method of gratifying the bibliomanist taste is that of enriching works by the addition of engravings—illustrative indeed of the text of the book, but not particularly called for—and of preparing only single copies. Thus, a bookseller in London offers an illustrated copy of the otherwise common Biographical Dictionary of all the Engravers, by John Strutt (London, 1785–86, two vols. 4to), which is increased in this way to thirty-seven large vols. in folio, and costs not less than £2000 sterling. The library of Dresden has a similar copy of Budæus's Historical Lexicon, of an earlier date.

Among the auctions, where the bibliomania raged with the greatest fury, was that of the library of the Duke of Roxburgh in London, 1812. Every work was bought at an almost incredible price. The first edition of Boccaccio, published by Valdarfer in 1471, was sold for £2260 sterling. To the memory of this auction the Roxburgh Club was founded in the following year, of which Lord Spencer was president. It met yearly on the 13th of July, the anniversary of the sale of Boccaccio, in the St. Alban's Tavern. The fortunate purchaser of the

Decameron at this sale was the Marquis of Blandford; at his death, in 1819, it was sold for £918, 15*s.*, and ultimately came into the possession of Earl Spencer, who had bid £2250 for it at the great sale. No further evidence is necessary to show that bibliomania, which flourished first in Holland (the seat likewise of the *tulipomania*), towards the end of the seventeenth century, has prevailed in England to a much greater extent than in France, Italy, or Germany. Thomas F. Dibdin's Bibliomania or Bookmadness (London, 1811), and his Bibliographical Decameron (London, 1817, three vols.), contain many useful directions for the assistance of collectors of books.

The modern bibliomania is very different from the spirit which led to the purchase of books in the middle ages at prices which appear to us enormous. External decorations, it is true, were then held in high esteem; but the main reason of the great sums then paid for books was their scarcity, and the difficulty of procuring perfect copies before the invention of the art of printing. There is sometimes found a rage for possessing books without reference to the value of their contents, or the other circumstances which have been mentioned as influencing the bibliomanist. A priest in Saxony is said to have murdered three persons with a view of getting possession of their libraries. These, however, he did not read.

BICANERE, a principality, Hindoostan, prov. Ajmeer. Its limits are variable, and not easily defined, as it merges on the great desert of Ajmeer, supposed to be about 18,000 square miles, chiefly between 27° and 29° N. Soil light brown sand. Indian pulse almost its only produce. Admitted to British protection in 1818. Pop. 539,250.

BICANERE, or BICKANEER, a town, Hindoostan, capital of the above principality, 240 miles W. by S. from Delhi, with a population vaguely estimated at 60,000 to 70,000. With its battlemented walls and large citadel, both flanked with round towers, and its temples, one of which terminates in a lofty spire, it presents a magnificent appearance to the traveller approaching it through the desolate tract of country in which it stands; but a nearer inspection dispels the illusion, and the greater part of the houses are found to be hovels of mud painted red. In the citadel there is a well 20 feet in diameter, and 50 fathoms deep.

BICÊTRE, a village of France, a little to the S.W. of Paris, with a famous hospital for old men in indigent circumstances, and an asylum for lunatics, together forming one vast establishment. This establishment was originally a castle, built in 1285, which, after being long in a ruinous state, was restored by Louis XIII., and destined as a retreat for infirm officers and soldiers. When Louis XIV. afterwards erected the great Hôtel Royal des Invalides, Bicêtre became a general hospital, and it continued as such down to the revolution, while it contained also a house of correction for swindlers, thieves, &c. The establishment was then entirely altered and converted to its present use, the buildings being partly pulled down and replaced by new ones. The poor persons admitted must be at least seventy years of age, or incapacitated from earning a livelihood by some incurable disease. The lunatics are such as belong to the department of the Seine. They are attended to with the greatest care, and fabricate neat little works of wood and bone, known in France by the name of *Bicêtre works*. The number of beds in the institution is over 2700.

BICHAT, MARIE FRANÇOIS XAVIER, a celebrated French physician, who, during a short career, gave an impulse to the science which he cultivated that has not yet ceased to be felt, was born at Thoirette, in the department of the Ain, Nov. 11, 1771. His father, a physician, early initiated him into the study of medicine, which the young Bichat prosecuted at Lyons and Paris, to which latter city he withdrew from the storm which agitated the former in 1793. At Paris he studied under the direction of Desault, who treated him as a son. On the death of that distinguished surgeon (see DESAULT) Bichat superintended the publication of his surgical works, and in 1791 began to lecture upon anatomy in connection with experimental physiology and surgery. From this period, amidst the pressing calls of an extensive practice, he employed himself in preparing those works which have spread his reputation through Europe and America, and which have had the most beneficial influence upon the whole medical science. In 1800 appeared his Traité des Membranes, which passed through numerous editions, and immediately after publication was translated into almost all the languages of Europe. In the same year was published his celebrated work Recherches sur la Vie et la Mort, which was followed the next year (1801) by his Anatomie Générale (four vols. 8vo)—a complete code of modern anatomy, physiology, and medicine. In the twenty-eighth year of his age Bichat was appointed (1800) physician of the Hôtel-Dieu, in Paris, and with the energy characteristic of true genius began his labours in pathological anatomy. In a single winter he opened no less than 600 bodies. He had likewise conceived the plan of a great work upon pathology and therapeutics; and immediately upon commencing his duties as physician to the Hôtel-Dieu he began his researches in therapeutics by experiments upon the effects of simple medicines. In the midst of his activity and usefulness he was cut off, July 22, 1802, by a malignant putrid fever, probably the consequence of his numerous dissections. His friend and physician, Corvisart, wrote to Napoleon in these words: 'Bichat has just fallen upon a field of battle which counts more than one victim: no one has done so much, or done it so well, in so short a time.' Bichat is the founder of the medical theory at present received. He is the creator of general anatomy, or of the doctrine of the identity of the texture of the different organs, which is the fundamental principle of modern medicine. His Anatomie Générale has been translated into English by Dr. G. Hayward, and published in three vols. 8vo.

BICKERSTAFF, ISAAC, a well-known dramatic writer of the last century, born in Ireland about 1735. He wrote many successful pieces for the stage, some of which, such as the operas of Love in a Village and The Padlock, are still popular. His celebrated comedy also of The Hypocrite, adapted from Colley Cibber's Nonjuror, which was again borrowed in its leading incidents from Molière, long retained its place on the stage, with its well-known characters of Mawworm and Dr. Cantwell. The music of many of Bickerstaff's pieces was composed by Charles Dibdin. Latterly he retired to the Continent, and died there in obscurity, but when is unknown.

BICKERSTETH, REV. EDWARD, an active and devoted clergyman of the Church of England, was the son of a surgeon in Kirkby-Lonsdale, Westmoreland, and was born there on 19th March, 1786. He was educated in the grammar-school of his native town, and at the age of fourteen was placed in a situation in the post-office, London. After remaining there for six years he served an apprenticeship of five years as an articled clerk with Mr. Bleasdale, a London attorney. He then commenced business as a solicitor in Norwich, in partnership with his brother-in-law, Mr. Bignold—an undertaking which rapidly prospered, and from which he soon

found himself realizing a large and increasing income. A great change however now came over his mind—the truths of religion made a deep impression on him, and he began to exert himself in promoting their diffusion among his fellow-men. Among other works accomplished by him was the establishment of the Norwich Church Missionary Society. He also published in 1814 A Help to the Study of the Scriptures, which met with great success. But nothing could now satisfy him till he had fairly embarked all his energies in the cause of religion, and he accordingly resolved to abandon the legal profession for that of a minister of the Church of England. The Church Missionary Society wished to send him abroad on a special mission to Africa, and in this view the Bishop of Norwich, dispensing with the usual course of a university education, admitted him to deacon's orders on 10th December, 1815, and a fortnight afterwards he was admitted to full orders by the Bishop of Gloucester. Mr. Bickersteth thereupon with his wife proceeded to Africa, from which, after accomplishing satisfactorily the objects of his mission, he returned in the following autumn. He now filled the office of secretary to the Church Missionary Society, and from this period to 1830, when he resigned it, was most zealous and indefatigable in the performance of its multiform duties. In the year last mentioned he became rector of Watton in Hertfordshire, and spent there the remainder of his life. By this time Mr. Bickersteth was widely known throughout the kingdom as one of the most influential and popular clergymen of the evangelical section of the church. Besides taking a constant and active share in furthering the cause of the various religious societies, including the Evangelical Alliance, of which he was one of the founders, he likewise issued from the press a series of publications which had an immense circulation. These include among others The Christian Student, A Treatise on the Lord's Supper, A Treatise on Prayer, The Signs of the Times, The Promised Glory of the Church of Christ, The Restoration of the Jews, A Practical Guide to the Prophecies, besides sermons and tracts without number. In 1846, while proceeding to a meeting of the Evangelical Alliance, he sustained a terrible accident by being thrown from his chaise under a loaded cart, the wheels of which passed over him. He died of congestion of the brain on 24th February, 1850.

BIDASSOA, or VIDASOA (Basque, 'way to the west,' or 'two streams'), a river, Spain, about 45 miles long, the last 12 of which form the boundary between France and Spain. It rises in the mountains of Spanish Navarre, and, after various changes of direction, falls into the Bay of Biscay near Fontarabia. In former times Spain claimed not only the entire river, but so much of its banks, on the French side, as its waters covered at full tide. This difference was finally settled by each country contenting itself with its own shore. Near Irun there is a small island in the middle of the stream, called the Island of Pheasants, on which, being a sort of neutral ground, Louis XI. and Henry IV. met in 1463. Here also a peace was concluded between France and Spain in 1654; and here again in 1660 Cardinal Mazarin met Louis de Haro, and arranged the marriage between the daughter of Philip IV. and Louis XIV.

BIDDEFORD, a town, United States, Maine, on the Saco, close to the falls, and about 6 miles above its mouth, on the Portland, Saco, and Portsmouth Railway, 12 miles S.W. Portland. It possesses several churches, an academy, and other excellent schools, a large iron foundry, numerous cotton, flour, and saw mills, and carries on an extensive trade, particularly in lumber. The falls, though furnishing valuable water-power, seriously obstruct the navigation of the river, and thus limit the foreign trade. As Saco lies immediately opposite on the river, the two towns may be considered as one. The pop. in 1870 was 10,282.

BIDDLE, JOHN, a celebrated Socinian writer, was born in 1615, at Wotton-under-Edge, in Gloucestershire. He entered Magdalen College, Oxford, in his nineteenth year. He graduated as A.M. in 1641. Being led to doubt of the doctrine of the Trinity, he drew up twelve arguments on the subject; in consequence of which he was committed to jail by the parliamentary committee then sitting at Gloucester, but was liberated on security being given for his appearance when called for. About six months afterwards he was examined before a committee of Parliament, to whom he readily acknowledged his opinion against the divinity of the Holy Ghost. His Twelve Arguments were now ordered to be burned by the common hangman. He however persisted in his opinion, and in 1648 published two tracts, containing his Confession of Faith concerning the Holy Trinity, and The Testimonies of Irenæus, Justin Martyr, and several other early writers on the same subject. These publications induced the Assembly of Divines to solicit Parliament to decree the punishment of death against those who should impugn the established opinions respecting the Trinity and other doctrinal points, as well as to enact severe penalties for minor deviations. The Parliament indulged these ministers in their intolerant request, which immediately exposed Biddle, who would neither consent nor recant, to the loss of life; but difference of opinion in the Parliament itself, and the penalties to which this sweeping measure rendered many in the army liable, prevented its execution. He was some time after again remanded to prison, by the zeal of President Bradshaw, and remained for some years in confinement, subjected to the greatest privations. A general act of oblivion in 1651 restored him to liberty, when he immediately disseminated his opinions both by preaching and by the publication of his Twofold Scripture Catechism. A complaint being made to Cromwell's Parliament against the book, he was confined in the Gate House for six months. Cromwell banished him to St. Mary's Castle, Scilly, where he assigned him an annual subsistence of a hundred crowns. Here he remained three years, until the Protector liberated him in 1658. He then became pastor of an Independent congregation, and continued to support his opinions, until fear of the Presbyterian Parliament of Richard Cromwell induced him to retire into the country. On the dissolution of that Parliament he preached as before until the Restoration, after which he was obliged to confine himself to private preaching. In June, 1662, he was apprehended at one of the private assemblies, and upon process of law fined £100, and ordered to lie in prison until it was paid. He fell a victim to this sentence, by catching one of the distempers so common at that time in jails, and died in September of this year, in the forty-seventh year of his age, a martyr to religious intolerance. The private character of this courageous sectarian, like that of most of those who suffer from principle, was moral, benevolent, and exemplary; and his learning and logical acuteness rendered him very fit to gain proselytes. He did not agree in all points with Socinus, but was apparently unsolicitous to establish a perfect agreement. Toulmin styles him the *father of the modern Unitarians*.

BIDEFORD, a market town and river port, England, county Devon, 44 miles N. of Plymouth, picturesquely situated on both sides of the Torridge,

the principal portion being on the W. side, on a bold acclivity, 3 miles from the sea. A handsome stone bridge of twenty-four arches, and 677 feet in length, connects the two divisions of the town. There are six principal streets, all well paved, and which, from their being on a slope, are always clean and dry; houses mostly of stone, and generally well built. Near the centre of the town is a spacious market-place; and, on the margin of the river, a commodious quay. The principal public civic buildings are the town and guild halls, the former a neat edifice. There are six different places of worship, including the parish church; an endowed grammar and other schools, and a literary and scientific institution, with a good library. The woollen manufactures, formerly considerable, have been discontinued. The most important manufactures now are coarse earthenware, and pottery of a finer description, ropes, sailcloth, ship-building, and the various branches connected therewith. In former times Bideford had an extensive shipping trade, having, at the close of the seventeenth century, more ships engaged in the Newfoundland trade than any port in England, except London and Topsham. It is also said that it imported more tobacco in some years of last century than the metropolis. The trade of the port is still considerable. The imports consist chiefly of timber, hemp, tallow, wines, fruit, cattle, coal, iron, flagstones, &c. The principal export is agricultural produce. Pop. in 1871, 6969.

BIDPAI. See PILPAY.

BIDSCHOW, NEU, or NEW BICZOW, a town, Bohemia, 45 miles E.N.E. from Prague, on the Czidlina, near a small lake. It is very old, and has a church, a synagogue, a townhouse, and a hospital. The inhabitants live chiefly by agriculture and weaving. Pop. 5957, of which fully a half are Jews.

BIELEF, or BELEV, a town in the government of Tula (62 miles S.W. of the capital of that name), in Russia. Bielef is situated on the left bank of the Oka. It has manufactures of soap, leather, and hardware, and a considerable general trade. Pop. 8123.

BIELEFELD, a town of Prussia, in the province of Westphalia, 38 miles E. from Münster; pop. 21,800. The best German linens are manufactured here, flax-spinning and bleaching are largely carried on, and there are other manufactures.

BIELGOROD, a town, Russia, government of, and 76 miles S. from the town of Kursk, on the Donetz, consists of an old and new town, with three suburbs. The houses are nearly all of wood. It is the seat of an archbishop's see, contains thirteen churches and two monasteries, and has three important fairs, each lasting for a week. Its name, which in Russian signifies 'white town,' is derived from a chalk hill in the vicinity. The environs are noted for producing fine fruits. Pop. 15,200.

BIELITZ, a town, Austrian Silesia, in the government of Brünn, 42 miles W.S.W. of Cracow, on the left bank of the Biala, which divides Silesia from Galicia. A stone bridge connects it with the town of Biala in Galicia. It has extensive manufactures of woollens and linens, and dyeworks and printfields of considerable repute. A large amount of business in manufactures is done with Hungary, Italy, Poland, Russia; and in Hungarian wine, sent to Prussia, Silesia, and Galicia, from which last province it in return receives rock-salt. Here are several charitable institutions, and a Protestant consistory, having under its jurisdiction Moravia and Austrian Silesia. The town was totally destroyed by fire in 1808. Pop. 10,721.

BIELLA (Latin, *Bugella*), a town, Italy, Piedmont, in the province of Novara, 36 miles N.N.E. of Turin, on the Cerno. It is the seat of a bishop, and of a district court of justice; and contains a cathedral, five parish churches, eight convents and monasteries, two hospitals, and a college. Manufactures—cloth, serges, linen, and stockings, silk, wool, and paper; and some trade is carried on in silk, oil, and chestnuts. Pop. 7700.

BIELSKI, MARCIN, one of the oldest historical writers of Poland, was born about 1495, entered the army, and was present in 1531 at the great battle of Obertyn, where the Prince of Wallachia was signally defeated by the Hetman Tarnowski. He afterwards settled at his native town, Biala, and died there in 1575. He wrote two remarkable poems, in one of which he describes the miserable state to which faction had reduced Hungary, employing it as a warning to his countrymen; and in the other bewails the deplorable condition to which his country had been reduced. His fame however rests not so much on these as on his Kronika Swiata, containing a general history of the world from the creation to his own time, and written in a style remarkable for vigour and conciseness, and his Kronika Polska, a history of Poland (continued by his son Joachim).

BIENNE, or BIEL, a town, Switzerland, canton of Bern, 16 miles N.W. of the capital, beautifully situated at the N. end of the lake of same name, and at the foot of the Jura. It is approached by several planted avenues, and surrounded by ancient walls, with watch-towers at intervals. From its position at the point where several main roads meet, it has a considerable transit trade. Pop. 8113.—The LAKE, called in German Bidersee, is about 10 miles long by 3 broad, and has a depth of 30 fathoms. Its scenery is more beautiful than bold. Being 8 feet below the level of Lake Neufchatel, it receives its waters by the Thiel and discharges itself into the Aar. On the islet of St. Pierre in this lake, J. J. Rousseau resided for two months to avoid his imagined persecutors.

BIÈVRE, MARQUIS DE, Marshal, born 1747, served in the corps of the French musketeers, was a life-guard of the King of France, and acquired much reputation by his puns and repartees. After publishing several entertaining works, he composed (1783) Le Séducteur, a comedy in verse, for the theatre, which has maintained its place on the stage, although it is bad both in plan and execution. When he was introduced to Louis XV., the king wished to hear a *calembourg* (pun) of his. *Donnez-moi un sujet, sire* (Give me a subject, sire), said Bièvre.—*Faites-en un sur moi* (Make one on myself).—*Sire, le roi n'est pas un sujet* (Sire, the king is not a subject), was the answer. In 1789 he went to Spa for the benefit of his health, and died there. *Mes amis*, he said, dying, *je m'en vais de ce pas* (*de Spa*). He has written several works; among others, an Almanach des Calembourgs. There is also a collection of his jests called Bièvriana.

BIG. See BARLEY.

BIGAMY, in the canon law, means being twice married; in the common acceptation of the word, as a term of municipal law, it means the being married to two wives or husbands at the same time. The laws relating to plurality of wives or husbands might be supposed to come strictly under the head of *polygamy;* but, as it constitutes an offence against these laws to have more than *one* husband or wife, they are usually brought under that of *bigamy;* and, in compliance with this usage, they will be introduced in this place. The laws of every civilized society make some provision respecting this subject. By the statute of 4 Edward I. stat. 3, cap. 5, the marrying of a second husband or wife, the first being alive, was made felony; and by that of 2 James I. cap. 11 this crime was made punishable by death.

But the same statute provided that, where either party was absent beyond seas for seven years, whether known or not known to the other party to be alive, or was absent, though not beyond seas, for the same period, and not known by the other party to be alive, the other party was at liberty to marry again. Now, however, one of the parties is not held guiltless unless the other was absent continuously for seven years, and was not known to be alive. The penalty has been lessened by subsequent enactments, and the guilty party is now liable to penal servitude for seven years, or not less than three; or to be imprisoned with or without hard labour for not more than two. Every person aiding or abetting the bigamist is held to be equally guilty, and may receive the same punishment. The statute of James I. has been adopted in most of the United States as to the description of the crime; but the American laws generally differ from it as to the penalty, having assigned, heretofore, instead of death, as provided by the English statute, the punishment of whipping, setting on the gallows, &c., which latter is the punishment in France; but most, if not all of the United States, have now dispensed with these corporal inflictions, some of them prescribing imprisonment and hard labour for a number of years, according to the discretion of the court; others leaving it to the verdict of the jury to fix the period of imprisonment.

BIGGAR, a village in the upper ward of Lanarkshire, Scotland, 25 miles S.W. Edinburgh, on a branch of the Caledonian Railway, and on both sides of the Biggar Water. It consists chiefly of one principal street, straight, spacious, and well built. The principal building is the church, which is in form of a cross, with a tower in the middle, but the steeple was never finished. Hand-loom weaving is carried on to some extent, as also nail-making. Pop. in 1871, 1471.

BIGGLESWADE, a market town in England, county Bedford. The town is pleasantly situated on the right bank of the Ivel, here crossed by two stone bridges, 9 miles S.E. Bedford. Since 1785, when a large portion of the town was destroyed by fire, it has been greatly improved, and now presents a very handsome appearance. The making of white-thread lace and edging, and straw-plaiting, afford employment to a considerable portion of the female population. The river is navigable to the town, and affords the means of carrying on a considerable traffic in coals, timber, and oats. The Great Northern Railway, which passes through the town, has a station near it. Pop. in 1871, 4244.

BIHACS, or BIHATCH, a fortress of Turkey, on an island of the Unna, about 50 miles E. of the Adriatic. It has a low and unhealthy site, but is remarkable for its strength. The possession of it has often been keenly contested during the Turkish wars. Pop. 3000.

BIJANAGUR, or VIJAYANAGARA, an ancient and celebrated city of Hindoostan, now in ruins, in the province of Bejapoor, 30 miles N.W. of Bellary. It stands in a plain, surrounded by enormous masses of granite, and covers an area nearly 8 miles in circuit. On the N. and W. it is washed by the Toombuddra, and in other directions is inclosed partly by natural precipices and partly by strong stone walls. Among its edifices are a magnificent temple to Mahadeva, with a pyramidal portico about 160 feet high, divided into ten stories; a temple to Wittoba, also entered through a painted pyramidal portico; and a temple of Rama, with pillars of black hornblende covered over with elaborate mythological sculptures. These buildings, and many others besides, are in the purest style of Hindoo architecture. Its ruin was effected by a confederation of Mohammedan rajahs, who took and sacked it in 1564.

BIJA-PUR. See BEJAPOOR.

BILBAO, or VILVAO, a city in Spain, capital of the province of Biscay or Bilbao, is a sea-port on the Nervion, in a plain surrounded with high mountains; lon. 2° 54′ W.; lat. 43° 16′ N.; pop. 10,234. It is picturesque and well built, and has an important commerce and manufactures. The river is crossed by three bridges, one a handsome suspension-bridge of recent construction. The harbour is good, and well frequented. Nearly 600 vessels visit this port annually; and the yearly export of wool is estimated at 50,000 or 60,000 sacks, of 2 cwts. each. The air is healthy; the inhabitants are strong, robust, and live long. It is well supplied with water and provisions: fish are very abundant; and the environs are fertile in legumes and fruits. It contains five parishes and twelve religious houses. The chief educational establishment is the General College of Biscay. The trade of Bilbao is still considerable, though much less important than formerly. Among its staples are wool and dried cod.

BILDERDYK, WILLIAM, an eminent Dutch poet, was born at Amsterdam, 1756. He studied the classics at Leyden, chiefly under Ruhnken and Valkenaer. In 1776 he obtained from the learned society of Leyden, whose judgment was always respected, the first prize for a poem on the influence of poetry upon government. In the following year he obtained from the same society two prizes for an ode and a didactic poem, On True Patriotism. Since that period he has ranked among the first Dutch poets. He introduced into Dutch poetry iambics and hexameters, to show his talent for overcoming difficulties, although he declared these measures not admissible into Dutch poetry. In 1780 he obtained a new prize for a poem on the connection of poetry and eloquence with philosophy. He added to this poem, some time afterwards, an important commentary, which showed him to be a man of learning and a philologer. Bilderdyk, besides, devoted himself to law, at the Hague, with great success. On the invasion of the Netherlands by the French he left his country on account of his adherence to the hereditary stadtholder, and removed to Brunswick, where he studied the German language and poetry, and afterwards to London, where he delivered, in the French language, lectures on literature and poetry, which were numerously attended. After the new order of things was firmly established in Holland, he returned in 1799, and soon afterwards published some of his principal works. Among these are a didactic poem on astronomy, and the masterly imitations of Delille's L'Homme des Champs, and Pope's Essay on Man. Louis Bonaparte, on his accession to the throne, appointed him his teacher of Dutch, and one of the first members of the national institute founded by him. After the incorporation of Holland into the French Empire, Bilderdyk's muse was silent; but she rose the more vigorously after the deliverance of his country. Perhaps there is no poem of our time superior in fire, vigour, and enthusiasm to Holland's Verlossing, the joint composition of Bilderdyk and his wife, who was a successful poetess. When Napoleon returned from Elba Bilderdyk produced a number of war-songs, which are considered among the best in Dutch poetry. He published his Mengelpoezy (Miscellaneous Poems, two small volumes, Rotterdam, 1823, 2d ed.), which contains some ballads and imitations of Ossian. He died in Dec. 1831.

BILE, the fluid contained in the larger hepatic ducts, and in the gall-bladder, a special receptacle for it. Though tolerably alike in all animals, it varies both as to the substances it contains and their amount. The bile of the pig and ox have been

chiefly examined, not so much that of man, on account of the difficulty of obtaining it. As got from the gall-bladder it has a colour varying from yellow or yellowish green to greenish brown, and sometimes to almost black; when fresh it has a not unpleasant odour of musk, and a very bitter taste. Sometimes it is clear and limpid, at others it is muddy, from the separation of mucus, or thick and black like tar. When the mucus remains in it, it very soon putrefies, but if precipitated and removed, the bile can be preserved for a considerable time. Fresh bile is neutral or slightly alkaline; after decomposition it is alkaline, and then inorganic salts begin to precipitate in it. In the bile of animals a large number of substances have been isolated and identified. The most important are: the organic so-called biliary acids in combination with sodium and potassium; colouring matters, of which several have been described; cholesterin, cholin, lecithin, taurine, fats, fatty acids combined with alkalis; inorganic salts, consisting of alkaline and alkaline earth chlorides, carbonates and phosphates, with traces of iron, manganese, &c. These substances are all held in solution by water, the proportion of which varies in the bile of different animals from 80 to 95 per cent. Besides these, which exist normally in bile, there are many other substances which are present in different diseases, and which may be formed by the decomposition of some of the above named; various mineral substances also, such as arsenic, antimony, copper, pass into the bile, when they have been swallowed. The concretions called gall-stones vary a good deal in composition. The varieties are classified according to their structure, colour, and ingredients. Some are crystalline, but they more commonly have a smooth soap-like appearance. They consist of cholesterin, and are generally of a light colour. When the gall-stone is very dark it contains biliary colouring matter. The rarest kinds of gall-stones are those which are composed of inorganic salts, such as calcic phosphate, and carbonate. The gall-stones of animals are not unlike those of man just enumerated. The most curious are those from the antelope, called *bezoars* (which see).

Notwithstanding numerous investigations, the function of the bile is by no means clearly understood, and on some points physiological chemists hold very nearly diametrically opposite opinions. Thus, for example, it is not certain whether it has a part to play in digestion, or whether it is merely an excretion. Some hold that it acts as a solvent on certain parts of the food, others assert that it has little or no solvent action. However this may be, it seems probable that, if not directly, indirectly it assists in the absorption of food, and that as a very large proportion of it returns into the circulation, it is not like the other waste products of the body. It exercises further an influence on fat, with which it forms an emulsion, and thereby facilitates its absorption and diffusion. Purified bile has been employed for washing fine woollen articles of dress, to avoid destroying their colour.

BILEDULGERID, an extensive and little-known tract, North Africa, lying between the S. declivity of Atlas and the Great Desert, and between Fezzan on the E., and Cape Non, on the Atlantic, on the W. It consists of gently-inclined plains, which spread to the foot of the mountains, and which are nearly as sandy and barren as the desert itself, excepting along the courses of the numerous streams descending from the S. slopes of the Atlas Mountains, all of which are absorbed by the sand, and many of which are strongly impregnated with salt. Along these streams date-palms abound, forming, with camels, horses, and cattle, the sole wealth of the inhabitants.

BILFINGER, or BULFINGER, GEORGE BERNARD, born at Cannstatt, in Würtemberg, in 1693, possessed great versatility of talent, and distinguished himself as a natural philosopher, a theologian, and a statesman. After studying at the schools of Blaubeuren and Bobenhausen, he entered the theological seminary of Tübingen, and for a time became so much attracted by the writings of Wolf and Leibnitz, that they almost engrossed his whole attention. Afterwards resuming the study of theology, he endeavoured to bring it into accordance with his favourite authors, and published a work of great originality, entitled De Deo, Anima, et Mundo. The reputation acquired by this work procured him the situation of chaplain to the castle and reader to the seminary of Tübingen; but he shortly after quitted these and went to Halle, to have an opportunity of listening to Wolf, who was then one of its most celebrated professors. On returning to Tübingen he found that the doctrines which had previously obtained him so much applause had fallen into disrepute, and he gladly availed himself of an offer made him through Wolf to become professor of logic and metaphysics at St. Petersburg. While thus occupied, the Academy of Sciences at Paris offered a prize for the best solution of the problem as to the cause of weight in bodies. Bilfinger entered the lists and was successful. His fame, now become European, attracted the attention of the Duke of Würtemberg, who, proud of possessing such a subject, recalled him in 1731, and made him successively privy-councillor, president of the consistory, and curator of the university. In all these situations, but especially in the last, Bilfinger exerted himself with success in introducing salutary reforms. He died at Stuttgart in 1750. Besides the work above named, he wrote a number of treatises, chiefly in illustration and defence of the philosophy of Leibnitz. One of these is entitled Dissertatio de Harmonia Præstabilita, and another treats of the Origin and Permission of Evil.

BILIN (Bohemian, *Bylina;* Latin, *Belina*), a post town, Bohemia, circle Leitmeritz, 42 miles N.W. Prague, prettily situated in the vale of the Bila. It is walled, contains a fine old castle built in 1680, and one of more modern date, in which is a good collection of minerals, an armoury, and a museum. In the town there are several churches, chapels, cotton-spinning mills, and beet-root sugar manufactories. Within 1 mile of the town are mineral acid springs, much resorted to, and from which 900,000 jars of water are exported annually. The waste water of the wells is evaporated, and the salts and magnesia thus obtained form important articles of commerce. The mineral ingredients of the water are chlorides, sulphates, and carbonates of potassium and sodium, small quantities of strontium, calcium, magnesium, and lithium, and aluminic phosphate. Of these the sodic-carbonate is the most abundant, amounting to 29·6 in 10,000 parts of the water. It is therefore an alkaline water, like that of Malvern, Selters, and other places, and is used with advantage in certain concretionary disorders. In the vicinity are found coal and garnet. Here is also the singular basaltic rock called Bilner Stein. The population is about 4000.

BILL, a word of very numerous significations in English. In natural history, the beak of a fowl. See ORNITHOLOGY.

An instrument of war and labour.—(1) A short axe or hatchet, with a hooked point, formerly used by foot-soldiers. English soldiers were particularly famous for the use of the bill. A common battle cry with the English was 'Bills and bows.' (2) An iron instrument with a curved head and wooden handle, used in gardening and other trades.

A written or printed paper containing a statement of any particulars. In common use a tradesman's account, a printed proclamation or advertisement, is thus called a bill. In Parliament a bill is a draft of a proposed statute submitted to either house for approval. When the bill has passed the two houses, and received the royal assent, it becomes an act. Procedure by bill in Parliament is distinguished from procedure by resolution, mainly by the fact that a resolution in Parliament declares the laws or affects the conduct of the executive, while a bill changes the law. (See PARLIAMENT OF GREAT BRITAIN.) In laws a bill is in England a declaration in writing to a court of law, expressing some complaint of the violation of a law or statute by which the complainant has received injury; in Scotland it is a summary application by petition to the Court of Session.

Below will be found an account of some of the most important forms in which the word bill is employed.

BILL OF ATTAINDER and of PAINS AND PENALTIES are forms of procedure in Parliament which have now practically fallen into disuse, but which were often resorted to in times of political agitation. An attainder in common law signifies the corruption of the blood of a criminal capitally condemned, includes forfeiture of goods, and takes away from descendants the right of succession. It is now abolished. Pains and penalties is a general term, which derives its significance from the particular pains and penalties imposed in the bill. Bills of attainder and of pains and penalties were promoted by the crown, or the dominant party in Parliament when any individual obnoxious to them could not readily be reached by the ordinary forms of procedure. Parliament being the highest court of the kingdom could dispense with the ordinary laws of evidence, and even, if actuated by passion or servilely devoted to the authorities, condemn the accused in the most arbitrary manner. Hence the convenience of this form of procedure. It was common, however, to allow the person accused to be heard at the bar of the house, but in the reign of Henry VIII., when the abuse of this power reached its highest point, even this privilege was at last denied. During the prosecutions of this reign, says Hallam, 'Cromwell inquired of the judges whether, if Parliament should condemn a man to die for treason without hearing him, the attainder could ever be disputed. They answered that it was a dangerous question, and that Parliament should rather set an example to inferior courts by proceeding according to justice. But being pressed to reply by the king's express commandment, they said that an attainder in Parliament, whether the party had been heard or not in his defence, could never be reversed in a court of law. No proceedings, it is said, took place against the person intended, nor is it known who he was. But men prone to remark all that seems an appropriate retribution of Providence, took notice that he who had thus solicited the interpreters of the law to sanction such a violation of natural justice, was himself its earliest example.' During this reign many persons of distinction were brought to the scaffold by means of bills of attainder, for denying the royal supremacy and other offences. After Henry VIII. this mode of procedure was comparatively little used.

BILL IN CHANCERY is a complaint to the Court of Chancery.

BILL OF COSTS is an account rendered by an attorney or solicitor of his charges and disbursements in an action, or in the conduct of his client's business.

BILL OF ENTRY and BILL OF SIGHT are custom-house forms required to be observed by merchants in shipping or landing goods. A bill of entry gives the necessary particulars of the goods; a bill of sight is an application to have the goods examined in presence of an officer, in the event of the merchant not being able to give the particulars.

BILL OF EXCHEQUER. See EXCHEQUER.

BILL OF MORTALITY. See MORTALITY.

BILL OF EXCEPTIONS. The counsel for any party dissatisfied with the ruling of a judge in a matter of law in any cause tried at Nisi Prius, may tender a bill of exceptions at any time before verdict, and require the judge to seal it. The point in dispute is then tried before a Court of Error. It is now more common to resort to a new trial.

BILL OF INDEMNITY is an Act of Parliament passed every session, by which those who have unwittingly or unavoidably neglected to take the oaths required for qualifying them to hold any public office, are relieved of the consequences of the neglect.

BILL OF RIGHTS and DECLARATION OF RIGHTS. A declaration, afterwards embodied in a bill, called the Declaration and the Bill of Rights, constituted the convention by which the Prince and Princess of Orange were called to the throne of England, and are the basis of the conditions on which the crown of England is still held.

When Parliament met to consider on what terms the crown forfeited by James should be conferred on William and Mary, 'the great majority of the Commons,' according to Hallam, 'wisely resolved to go at once to the root of the nation's grievances, and show their new sovereign that he was raised to the throne for the sake of those liberties by violating which his predecessor had forfeited it.'

The Declaration first recited the illegal acts of King James; secondly, declared these acts to be illegal; and thirdly, declared that the throne should be filled by the Prince and Princess of Orange in accordance with the limitations of the prerogative thus prescribed.

It contains the following specific declarations:—'That the pretended power of suspending laws and the execution of laws, by regal authority without consent of Parliament, is illegal; That the commission for creating the late courts of commissioners for ecclesiastical causes, and all other commissions or courts of the like nature, are illegal and pernicious; That levying of money for or to the use of the crown by pretence of prerogative without grant of Parliament, for longer time, or in any other manner than the same is or shall be granted, is illegal; That it is the right of the subjects to petition the king, and that all commitments or prosecutions for such petitions are illegal; That the raising or keeping a standing army within the kingdom in time of peace, unless it be with consent of Parliament, is illegal; That the subjects which are Protestants may have arms for their defence suitable to their condition, and as allowed by law; That elections of members of Parliament ought to be free; That the freedom of speech or debates on proceedings in Parliament ought not to be impeached or questioned in any court or place out of Parliament; That excessive bail ought not to be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted; That juries ought to be duly empanelled and returned, and that juries which pass upon men in trials of high treason ought to be freeholders; That all grants and promises of fines and forfeitures of particular persons, before conviction, are illegal and void; And that, for redress of all grievances, and for the amending, strengthening, and preserving of the laws, parliaments ought to be held frequently.

The Bill of Rights, passed in 1689, confirmed these declarations, settled the crown upon Protestants, and

declared that any king or queen of England who should marry a Papist would be incapable of reigning in England, and the subjects absolved from allegiance. It also rendered more stringent the clause in the declaration asserting the illegality of the power assumed by the kings of dispensing with the laws.

The United States and various European governments which have adopted constitutions, have based them on similar declarations of rights, but these declarations are often abstract, and not derived, as in the case of England, from liberties previously enjoyed or maintained.

BILL OF EXCHANGE (including *promissory notes* and *inland bills* or *acceptances*). A bill of exchange is a species of mercantile currency generally recognized among trading nations, and protected by laws which are founded on and derived from the customs of the principal trading communities. Mercantile documents of this kind appear to have been in use from the earliest times; Tyre, Carthage, Athens, Syracuse, and Alexandria were acquainted with them in some form. Indeed they arise so naturally out of the circumstances of mercantile intercourse, that nothing but the art of writing appears to be necessary to make recourse to them inevitable wherever an active trade is carried on.

Bills of exchange are divided in this country into foreign and inland bills, but in mercantile usage the term bill of exchange is seldom applied to other than foreign bills. An inland bill of exchange, generally called a bill or acceptance, has more in common with a promissory note than with a foreign bill of exchange. We shall first give the common forms of the three documents, which we purpose to consider together, and then explain their use, together with some of the leading principles of law applicable to them.

(1) *Promissory Note.*

£100:0:0. Liverpool, 1st January, 1873.

Three months after date I promise to pay to the order of W. S. [or 'to W. S. or his order'] the sum of One Hundred Pounds sterling, for value received.

(Signed) J D.

(2) *Inland Bill or Acceptance.*

£100:0:0. Liverpool, 1st January, 1873.

Three months after date pay to our order [or 'to the order of W. S.'] the sum of One Hundred Pounds sterling, for value received.

(Signed) F. G. & Co.

To Messrs. A. B. & Co., London.

This form is accepted by writing across the body of the bill:—

'Accepted,
A. B. & Co.'

(3) *Foreign Bill of Exchange.*

£100:0:0. Lima, 1st January, 1873.

At sixty days' sight of this first of exchange (second and third of same tenor and date unpaid) pay to the order of W. S. the sum of One Hundred Pounds sterling, value as advised [or, 'which charge to our account,' or 'to account of———as advised.']

(Signed) F. & Co.

To F. B. & Co., Liverpool.

(Second and third drawn in same form as the first, one only of the set being negotiable. Instead of three copies being used, which is called drawing a bill in parts, one only may be drawn, the form then used being 'this sola of exchange.')

The acceptor of this bill writes across it the date on which it is presented, together with his signature, thus:—

'Accepted, 4th Feb. 1873,
F. B. & Co.'

The first and second forms are, as to their effects, pretty nearly equivalent. The second is much more commonly used in mercantile transactions than the first. The variation contained in the parenthesis of the second form is what strictly constitutes an inland bill a bill of exchange; it is also comparatively little used. We shall, therefore, for convenience sake, confine the term bill of exchange to foreign bills, and call the other forms inland bills.

Any bill when accepted is a completed acknowledgment of debt, and fixes a precise time for its payment. The convenience of such a form of acknowledgment in mercantile affairs is so great that this form is protected by the laws of all mercantile communities by special privileges. In general the holder of a bill can proceed against the drawer or acceptor in a summary manner without the common forms of an action at law, the bill being considered by all law-courts as containing proof in itself of an uncancelled obligation. As soon as a merchant or trader fails to pay his bills when due the fact is made public, and he is virtually considered and treated as bankrupt. The holder of the bill by proceeding against him can also compel him to pay or take refuge in legal bankruptcy. On account of the stringency with which the payment of bills is demanded they have come to obtain a certain currency, or to be, in mercantile phrase, negotiable. There are two ways in which a bill may be negotiated. It may be paid to some one to whom the holder is indebted, or it may be transferred to some one who gives an equivalent for it in goods or cash. The former is comparatively a feeble test of negotiability, and a bill is not said to be negotiable in the strict sense unless actual value can be obtained for it. A bill is said to be negotiated privately when it is transferred in this way by one merchant to another; publicly, when it is offered for sale in open market, or transferred to a public banker or bill-broker. When the first holder of a bill, that is, the person in whose favour it is drawn, who is also called the payee, parts with it in any of these ways, he endorses it, that is, writes his name across the back of it, which form constitutes him an endorser of the bill, and renders him liable for it to any subsequent holder in the event of the failure of the acceptor, or drawee, to pay it. He may, however, escape this liability, at the expense of rendering the bill less negotiable, by writing before his signature the words 'without recourse.' The practice of endorsing bills without recourse is very common in America, very rare in this country; an accurate indication of a difference in the tone of mercantile transactions between the two countries which is very widely prevalent. The security of the subsequent holders of a bill is thus increased by each unqualified endorsation. The last phase in the negotiation of a bill is usually its being discounted with a banker. The merchant may either discount it with a bill-broker, who re-discounts it with the banker, or he may take it direct to the banker. The broker or banker deducts (as do also the previous negotiators of a bill) a discount, or equivalent for the use of the money he pays until the due date of the bill, when he expects it will be repaid him. The rate of this charge depends upon the length of time the bill has to run and its value as a security. A bill of which the security is undoubted is called a first-class bill. There is usually a current rate of discount for first-class bills, which is determined in this country by the rates of the Bank of England, which differ for long or short bills, a long bill being usually considered one which has more than three months to run. The great majority, both of foreign and inland bills, are now discounted at once by the payee with a broker or banker. It is not, however, unfrequent for either to pass through

several hands, and sometimes small bills of exchange drawn on the Continent pass through many hands before they are presented for acceptance. Bankers discount bills as a profitable investment for their money, and do not usually re-discount them, but wait their due date for payment. Instances, however, are not wanting in which bankers, having exceeded their available resources, have re-discounted their bills on a large scale.

Bills of exchange present a very convenient mode of transferring funds between distant markets. A., for example, in Calcutta receives goods from a correspondent in Manchester, or wishes to send money to a correspondent there to buy goods for him. B. is shipping produce from Calcutta to London. B. sells to A. a bill upon his London correspondent, and A. remits it to Manchester in payment of his goods. Thus B. at once receives payment of his produce, and A. is enabled to remit the price of his goods without taking the risk of shipping produce on his own account. A bill of exchange is thus negotiable previous to acceptance, which is not commonly the case with inland bills, and in the event of the bill not being accepted, the holder may have immediate recourse against the drawer or endorser, not only for the amount of the bill, but for any expense or loss incurred through its non-acceptance. A bill of exchange may be drawn on one country and remitted to another. It may be sold in the market where it is drawn, or remitted by the drawer in payment of a foreign debt. Thus a merchant in Calcutta may draw a bill on a merchant in Paris, and sell it to another Calcutta merchant who may remit it to a correspondent in London, or he may himself remit it to America or Australia in payment of some debt due by him there. The sale of bills of exchange has become in many markets a separate branch of banking. The way in which it is conducted is this:—A banker or exchange-broker, say in New York, buys the bills of merchants on London or Liverpool, and remits them to a correspondent in London who collects them. According to the amount of bills which he has purchased, he sells his own bills on the same correspondent, and as the bills of a banker or exchange-broker usually sell more favourably than those of a private merchant, the difference of rates between his sales and purchases constitutes his profit.

Bills of exchange between distant markets are usually made payable at a certain period after sight, those between near markets are more commonly made payable at a period after date. Thus, a merchant in New York or Calcutta draws a bill on this country at sixty or ninety days', or three or six months' sight, a merchant in Paris will probably draw on his correspondent in London at two, three, or four months' date. In the former case, when the bill is presented for acceptance, the drawee writes the date on which it is presented before his name, as seen in form No. 3, and the currency of the bill begins with this date, not, as in the latter case, with the date on which the bill is drawn. Another form of drawing a bill, which may now be considered antiquated, is drawing at usance. The habits of a particular market commonly lead to bills being drawn upon it more frequently at one particular term of currency than at any other. Bills on New York, for example, being frequently drawn at sixty days' sight, this is called the usance of New York, and a bill drawn on New York at usance would be payable at sixty days' sight. Another mode more useful, though now also comparatively rare, is drawing at par, or par of exchange. This also affects the period the bill has to run. Exchange is at par between two countries when a certain weight and fineness of the coin of one country exchanges for an equal weight and fineness of the coin of the other, or when the exchange is in the exact ratio of the weight and fineness of the currency. This is the basis of drawing at par, but the practical use of the term is not precisely limited to this signification. Assuming, for example, that the actual rate at which a dollar in New York would exchange for sterling money is 4*s.* 2*d.*, it may happen that sterling money is worth less in New York than in London, and that a person wishing a bill on London would not get 4*s.* 2*d.* for his dollar, but he may have a particular reason for wishing to remit at this exact rate; he therefore proposes to pay the exchange not in a direct deduction from the value of the dollar, but in time. A bill is therefore drawn, 'Pay to A. B. £100 sterling, the equivalent of $480, at par of exchange.' The acceptor of the bill calculates the exact value at time of presentation of $480 in sterling money, and the period when the payment of £100 would be equivalent to the payment of this sum, and fixes the due date accordingly.

Bills of exchange are, however, usually drawn in the currency of the country on which they are drawn, and the difference of exchange between this country and that of the country where they are drawn forms an element in the calculation of the value of the bill when it is sold or remitted.

Sometimes, both in inland and foreign bills, instead of the general expression, 'for value received,' or, 'value as advised,' the actual merchandise against which the bill is drawn is specified, as in a bill drawn from New Orleans, value in ◇A 1 to 100, 100 Bales Cotton ℔ *Calisto*. A bill of exchange drawn in this way does not necessarily convey a lien upon the goods, but in particular cases it may have important legal consequences. If, for example, the goods were shipped on consignment, that is, sent to a foreign market for sale on account of the shipper, the holder of a bill drawn by the shipper in this way could, if it were unpaid, establish a lien upon the goods as against the creditors of the consignee; but if the goods were sold by the shipper, he could have no prior claim against the creditors of the purchaser.

To make the lien upon the goods against which a bill of exchange is drawn perfect, it is customary to attach to the bill what are called shipping documents, that is, the bills of lading (see below) for the goods, and sometimes an invoice or specification of their value. The purchaser of a bill, however, has no absolute security without reliance on the good faith and character of the drawer.

Much discussion has recently taken place as to the abuse of the credit conferred by the use of bills. The importance of this credit in mercantile transactions need not be commented on, nor the liability to abuse to which it is subject. The form which the reaction against abuses has recently taken, has been that of opposition to long-dated bills. It has been the practice, for example, of merchants in India to draw bills against produce shipped to this country at six months' sight. This date is now by many bankers and brokers considered too long, and bills at four months are more acceptable. To restrict credit is necessarily either to restrict business or to increase the capital necessary to carry it on. This is also the avowed intention of the advocates of restriction. Much, undoubtedly, may be said on both sides, but to any one who reflects carefully on the matter it will probably be evident that a mere restriction of the length of credit will only operate arbitrarily, and can never be a substitute for the exercise of vigilance and prudence on the part of discounters. The length of currency is no criterion of the soundness of bills, and one transaction may be as legitimate at six months, or even at twelve, as another at two.

When a bill of any kind reaches maturity, that is, the due date of payment, and is not honoured, or duly paid, it must be *noted* or *protested*. Protesting is a legal form, in which the payee is declared responsible for all consequences of the non-payment of the bill. Noting is a temporary form, used as a preliminary to protesting. It consists in a record by a notary-public of the presentation of the bill, and of the refusal of the payee to honour it. When a bill is noted, the extension of the legal protest may be delayed for a period of six months, without affecting any right of the holder, but unless a bill is noted for non-payment on the due date, the endorsers are freed from responsibility to pay it. A bill of exchange must also be protested for non-acceptance before proceeding against the drawer or endorsers.

In determining the due date of a bill, a legal allowance, varying in different countries, called *days of grace*, has to be taken into account. In this country three days of grace are allowed on all bills indiscriminately, except bills drawn on demand, which are consequently called 'orders,' and are written on a penny stamp, whatever be their amount. Until recently a bill of exchange payable at sight was considered a bill, had a stamp affixed according to its value, and was paid three days after sight. This was the practice at least in Liverpool and other provincial towns, but a different practice having come to prevail in London, the metropolitan usage has now been adopted uniformly, and all such bills are treated as orders on demand. In France days of grace are abolished by the article 135 of the Code de Commerce. In other countries they vary considerably.

A bill in this country to be legal must, as above noticed, be drawn on stamped paper, or have a stamp affixed; and a foreign bill, before being negotiated, must have a stamp of the same value as an inland bill affixed to it. The value of the stamp is 1*d.* for £5, and rises at fixed stages with the value of the bill at the rate of 1*s.* per £100.

The laws in this country, in regard to promissory notes and bills of exchange, are nearly alike. The term of prescription on bills is usually understood to be six years; some modern authorities, however, maintain that a bill duly protested will remain in force for forty years.

BILL OF HEALTH, a certificate or instrument signed by consuls or other proper authorities, delivered to the masters of ships at the time of their clearing out from all ports or places suspected of being particularly subject to infectious disorders, certifying the state of health at the time that such ships sailed. A *clean* bill imports that at the time that the ship sailed no infectious disorder was known to exist. A *suspected* bill, commonly called a touched patent or bill, imports that there were rumours of an infectious disorder, but that it had not actually appeared. A *foul* bill, or the absence of clean bills, imports that the place was infected when the vessel sailed. (MacCulloch's Com. Dic.) See QUARANTINE.

BILL OF LADING is an engagement signed by the captain or owner of a vessel, acknowledging the delivery on board his vessel of certain specified merchandise 'in good order and condition,' and undertaking to deliver them 'in like good order and condition' at the port of destination. The particular conditions of the contract are specified in the bill of lading. There are common printed forms which are usually adhered to, but additional clauses are often added by the owner or shipper, and many large shippers, and particularly owners of vessels, use forms printed for themselves. The bill of lading usually specifies the amount and term of payment of freight, which is sometimes paid on shipment, sometimes on delivery of the goods, but for payment of which the goods are held as a lien. Bills of lading are usually drawn in sets of two, three, or four copies, as suits the convenience of the shipper. Each copy must be written on a sixpenny stamp, under a penalty of fifty pounds. Plain copies, which are not included in the set and have no validity as documents, may be used simply as copies. Where the freight is unpaid, one stamped copy, called the freight copy, is retained by the owner as representing his lien. Bills of lading can be transferred by endorsement (see BILL OF EXCHANGE). The endorsement transfers all rights and liabilities under the bill of lading of the original holder or consignee (18 and 19 Vict. cap. iii.)

BILLAUD-VARENNE, JACQUES-NICOLAS, a noted French revolutionist, was born at Rochelle on 23d April, 1756. He was bred to the legal profession, and having come in 1785 to Paris to practise as advocate in the Parliament, he at first turned his attention to literature, and composed a satirical comedy and an opera. Political events soon began to occupy his attention, and in 1789 three treatises appeared from his pen, entitled respectively Despotisme des Ministres de France; Dernier Coup Porté aux Préjugés et à la Superstition; and Le Peintre Politique. Another publication, Acéphalocratie, which appeared in 1791, subjected him to a judicial prosecution, and he was obliged to conceal himself for a time. He emerged from his retreat on the triumph of his party in September, 1791, and having been elected a member in 1792 of the national convention, he soon made himself conspicuous there by the violence of his Jacobinical zeal. On the trial of the king he voted for execution within twenty-four hours. He contributed to the overthrow of the Girondists, and was subsequently chosen president of the convention and member of the committee of public safety, and in that capacity framed the Bulletin des Lois, and assisted in organizing the revolutionary government. In 1795, on a reaction having taken place against the ultra party, he was arrested, and along with Collot d'Herbois banished to Cayenne. On the overthrow of the directorial government he refused the amnesty offered by Bonaparte, on the ground that his power was not derived from the people. In 1816, on the restoration of Cayenne to France, he was obliged to take refuge at Port-au-Prince, in the island of St. Domingo. Here he endeavoured to support himself by the exercise of his original profession of law, but died in poverty on June 3, 1819.

BILLIARDS, a well-known game, requiring great skill of hand and eye. Billiards may, indeed, be said to rank first among games of physical skill in respect to the qualities necessary to command success in it, and the great amount of experience needed to make an accomplished player. Billiards is said to have been a French invention. It is first noticed as a fashionable amusement when recommended to Louis XIV. by his physicians. It has reached its present state by successive improvements, which are curiously associated in the French annals of the game with the successive revolutions in the history of the country. The mode in which it is now played in France is very different from what prevails in this country, ours apparently being the antiquated form of the game. Tables with pockets, the common form in this country, are now in France 'relegated to the remotest villages.' Carambolage, or the cannon game, as it is called here, is now the favourite game in France.

Billiards is played with ivory balls on a flat table, and various modes of play, constituting many distinct games, are adopted, according to the tastes of the players, some being, as already hinted, more in favour in one country, some in another. The com-

mon English billiard-table is an oblong, about 12 feet by 6, covered with fine and very smooth green cloth, and surrounded with cushions which are made elastic, much of the skill of the game consisting in calculating the rebound of the balls in various directions from the cushions. Along the edges of the table are six semicircular holes arranged at regular intervals in the cushion, through which the balls are allowed to drop into small nets called pockets, under the sides of the table. The pockets are placed one at each corner of the table, and two opposite each other in the middle of the long sides. Each player is provided with a cue (formerly a mace) to strike the balls. The cue is an instrument of wood from 4 or 5, to 6 or 8 feet long, rounded in form, and tapering gradually from 1½ inch in diameter at the butt to ¾ inch or less at the point, which is tipped with leather and rubbed with chalk to make the stroke smooth.

In the common game, which elicits the greatest variety of skill, two players engage. Each has a white ball, one distinguished from the other by a spot, and a red ball is common to the two players. In beginning the game, the red ball is placed on a spot near one end of the table, and equidistant from the corner pockets. A line is drawn across the table at the other end, marking off a space called baulk. In this space a semicircle is described, out of which the player, in commencing, must send his ball, either striking the red or giving his opponent a 'miss,' that is, playing without striking the red ball, which scores one against him. When the game has commenced, the player is at liberty to strike at either his opponent's ball or the red, and continues to play as long as he succeeds in scoring. The whole of an uninterrupted run of play is called a break.

There are various modes of scoring in the common game. When a player strikes both balls with his own, it is called a cannon, and counts two; when he pockets his own ball, after striking another, it is called a losing hazard, and counts two if made off his opponent's ball, three if off the red; when he pockets his opponent's ball it counts two; when he pockets the red, three. These strokes are called winning hazards, but notwithstanding this name, it is usually considered bad play to pocket your opponent's ball, as it is then taken off the table. The others may be restored as often as pocketed. When the player fails to strike either ball, it scores one against him; if he goes into a pocket without striking, it scores three against him. The effect of a stroke at billiards depends on so many conditions, that both theoretical knowledge and practical skill are required to make a player proficient. The force of the stroke, the point of the ball struck with the cue, the point of contact of the player's ball with the object ball, the effect of recoil from the cushions, are all subject of calculation, and constitute a theory of the game on which many treatises have been written. The skill acquired by celebrated players is very great; amateurs of moderate pretensions usually consider a game of 50 or 100 points as offering sufficient scope for the exhibition of their skill, but great players will frequently make several hundred at a break.

The rules of the game are very numerous, and as they are always to be found in the rooms where it is played, they need not be given here.

After the ordinary game, the most favourite varieties in this country are *pyramids* and *pool*. The former is so called from the position in which the balls are placed at the beginning of the game. It is played with fifteen balls; and the object of the players is to try who will pocket, or 'pot,' the greatest number of balls. Thus the pyramid-player acquires a greater skill in potting balls from every variety of position than the billiard-player, but as he is limited to this particular stroke, he has less scope for the exercise of a diversity of skill. Pool is also a game of potting, but is played somewhat differently. It is a favourite game with those who play for stakes, insomuch that it may be considered almost exclusively a gambling game. It embraces an indefinite number of players, each of whom is provided with a ball of a different colour from any of the others. They play in succession, and each tries to pot his opponent's ball. If he succeeds with one he goes on to the next; if he fails, another player takes his turn, playing first on the ball of the last player. There are thus two points which a pool-player has to aim at: to pot as many balls as possible, and to keep his ball in a safe position relatively to that of the following player, as the player whose ball is potted has to pay the penalty prescribed by the game.

BILLINGSGATE, a fish-market in London, established in 1699, and held every lawful day. Every person buying fish in Billingsgate Market may sell the same in any other market place or places within the city of London or elsewhere, by retail, with this condition, that none but fishmongers be permitted to sell in fixed shops or houses. No person or persons shall purchase at Billingsgate any quantity of fish to be divided by lots or in shares amongst any fishmongers or other persons, in order to be afterwards put to sale by retail or otherwise; nor shall any fishmonger engross, or buy in the said market, any quantity of fish, but what shall be for his own sale or use, under the penalty of £20. No person is to have in his possession, or expose to sale, any spawn of fish, or fish unsizable or out of season.—(36 Geo. III. cap. cxviii.) The minimum size of the lobsters to be sold at Billingsgate is fixed by statute.

By 6 Geo. IV. cap. cvii., no fish of foreign taking or curing, or in foreign vessels, is to be imported into the United Kingdom, under penalty of forfeiture, except turbots and lobsters, stock-fish, live eels, anchovies, sturgeon, botargo, and caviare. Fresh fish of British taking, and imported in British ships, and turbot, however taken or imported, may be landed without report, entry, or warrant. The importation of all kinds of fish into the United Kingdom was permitted on payment of duties in 1842, and in 1853 all duties on the importation were repealed. The fish trade since the latter date has been completely free.

From the character, real or supposed, of the Billingsgate fish-dealers, the term *Billingsgate* is applied generally to coarse and violent language.

BILLINGTON, Elizabeth, the most distinguished female singer of her day in England. She was born in England, of a Saxon family, her maiden name being Weichsell. She made her appearance as a singer at the age of fourteen, and at sixteen married Mr. Billington, a double-bass. She made her *début* as an operatic singer in Dublin, and afterwards appeared at Covent Garden, where she secured an engagement for the remainder of the season for £1000, the manager giving her two benefits. She visited France and Italy, and Bianchi composed the opera of Inez de Castro expressly for her performance at Naples. She married again in 1799, and retired from public life in 1809. She quitted England in 1817, and died in the Venetian territory in the following year.

BILSA. See Bhilsa.

BILSON, Thomas, a learned divine, born at Winchester, 1536, was educated at Winchester School, and after completing his studies at Oxford, became successively head-master of the school, and canon of the church of Winchester. In 1585 he published

a work entitled The True Difference between Christian Submission and Anti-Christian Rebellion, intended mainly to defend the government and policy of Elizabeth; and in 1593 another work, entitled The Perpetual Government of the Church, still considered one of the ablest defences of Episcopacy. In 1596 he was made Bishop of Worcester, and was translated in the following year to Winchester. In 1603 Bilson preached the coronation sermon before King James, and in 1604 he took a prominent part in the celebrated conference at Hampton Court. The translation of the Bible, executed during the reign of James, was partly submitted to his revision. He died in 1616, and was buried in the south side of Westminster Abbey.

BILSTON, a town, England, in Staffordshire, 3 miles S.E. from Wolverhampton. It extends along a height for nearly 2 miles, and becomes conspicuous at a considerable distance by the smoke of the numerous engines and furnaces employed in its extensive manufactures. These consist chiefly of iron bars, iron and brass castings, iron wire, machinery, steam-engines, coarse pottery, and tin, japanned and enamelled wares of every kind. A particularly fine sand for casting, and a very hard stone, suitable for grindstones, are obtained abundantly in the neighbourhood. Pop. in 1871, 24,188.

BINAB, a town, Persia, province of Azerbijan, on the left bank of the Sofi Chai, 55 miles S.S.W. from Tabreez, and 8 miles E. of Lake Urumia. It is abundantly supplied with water, and is one of the neatest and cleanest towns of Persia, having several good caravansaries and a bazaar. It is surrounded for many miles by orchards and vineyards; and from its mild climate is well adapted for the cultivation of grapes, vast quantities of which are exported to Tabreez. Pop. about 7500.

BINDRABUND, a large town, India, in the province and 35 miles N.N.W. of the town of Agra, on the right bank of the Jumna. It is famous as the scene of the youthful sports of Krishna, who has still many temples here. Among these, which are often in a very remarkable style of architecture, is a cruciform pagoda, which is one of the most massy and elaborate works of Brahminical superstition.

BINGEN, a town of the grand-duchy of Hesse-Darmstadt, situated on the left bank of the Rhine, and the right of the Nahe, opposite the village of Rüdesheim. Bingen existed in the time of the Romans, by whom it was called *Vincum* or *Bingium*. The bridge over the Nahe is said to have been built by Drusus, and bears his name. In the neighbourhood are the remains of a castle, where the Emperor Henry IV. was detained a prisoner in 1105, and the Mäusethurm or Mouse-tower, in the middle of the river, the scene of an ancient legend. A dangerous passage in the Rhine, called the Bingerloch, has recently been opened up by the blasting of sunken rocks, leaving a channel of 210 feet wide. Bingen is the market for the sale of wines produced in the neighbourhood which, particularly those of Rüdesheim, are much esteemed. It has recently declined in population, which is now 5936.

BINGHAM, JOSEPH, born at Wakefield, Yorkshire, in 1668, distinguished himself as a student at Oxford, and devoted his attention particularly to ecclesiastical antiquity. He left the university to become curate of Headbourn-Worthy, near Winchester, and there, while possessed of a scanty living on which his numerous family could barely subsist, had the merit of composing one of the most learned works of which his church can boast. This work on Christian Antiquities was published in eight vols. 8vo, and is still a standard on the subjects of which it treats. Bingham died in 1723.

BINGHAMPTON, a town, United States, capital of Broome county, state of New York, 80 miles from Syracuse, at the junction of the Chenango and Susquehanna rivers. It is handsomely laid out, and is a prosperous and active place, with eighteen churches, two banks, numerous schools, and other establishments. The town of Chenango is now included within it. Pop. in 1870, 12,692.

BINGLEY, the Garrick of the Dutch stage, was born at Rotterdam, in 1775, of English parents in good circumstances. He discovered an invincible inclination for the stage, and at the age of eighteen joined the company under the direction of the celebrated Corver, who was his first instructor. In 1779, in the twenty-fourth year of his age, he made his *début* on the stage of Amsterdam. The public odium was then excited against England on account of its ships having captured vessels under the Dutch flag without any previous declaration of war, and Bingley was unfavourably received on account of his English descent. But he soon conquered this prejudice by his performance of Achilles, in the tragedy of the same name, and from that time he continued to be the favourite of the public. He was also so well acquainted with the French language as to appear successfully in the French theatres of Amsterdam and the Hague by the side of the great French actors who, while on their tour for the sake of improving themselves, used to visit the Netherlands. In 1796 he was director of a company of actors, who played principally at Rotterdam and the Hague, but also visited other cities of Holland. Meanwhile he was always ready to perform at the theatre in Amsterdam, in such parts as could only be acted by himself. One of his last representations, in which he was assisted by the great actress Wattier Ziesenis, was the part of Farnese, in Lalain's tragedy of Maria, acted in 1818 before the royal family. In the same year he died at the Hague.

BINNACLE, or BITTACLE, a case or box which contains the compass for steering a ship, and lights to show the compass at night. In ships steered by a wheel it is common to have two binnacles, or a double binnacle, for the convenience of the steersman, on either side of the wheel; but in this case the compasses affect each other's direction, and thus render the ship's course uncertain.

BINOMIAL, in algebra, a quantity consisting of two terms or members, connected by the sign + or —. The binomial theorem is that celebrated formula which teaches to find any power of a given binomial $a+b$, by means of the two terms a and b, and of the exponent of the power. This theorem, frequently called the *Newtonian theorem*, on which the system of analysis is principally founded, was known, as far as relates to integral positive exponents, to several mathematicians before Newton. But Newton was the first who taught its application to fractional and negative exponents; and this discovery, one of the most important of those made by that great man, is engraved upon his tombstone.

BIOLOGY (Gr. *bios*, life), a comprehensive term for those departments of science that treat of living beings, including under this head both animals and plants. It therefore comprehends both botany and zoology, in all their details. See these articles, and also CELLS, CHEMISTRY (ORGANIC), EVOLUTION, GENERATION (SPONTANEOUS), LIFE, PHYSIOLOGY, PROTOPLASM, SELECTION (NATURAL), &c.

BION, born in Smyrna, or in its neighbourhood; a Grecian pastoral poet, of whose life no account is to be found. The elegy which Moschus, his friend and disciple, composed on the occasion of his death, seems to imply that he was a contemporary of Theocritus, and died of poison. He probably lived

in Sicily or Magna Grecia. Among the few poems written by him which have descended to our times, his elegy on Adonis is considered as the best. The poems of Bion, together with those of Moschus, are generally found as an appendix to the idyls of Theocritus. They have been published separately by Fr. Jacobs (Gotha, 1795); Gilbert Wakefield (London, 1795); and J. C. F. Maass (Leipzig, 1807).

BION OF BORYSTHENES, a Greek philosopher contemporary with Erastosthenes, born B.C. 275, and with Zeno the Stoic. He studied philosophy at Athens, first under Crates of the Cynic school, then took lessons of Theodorus, surnamed the Atheist; and at last, considering his studies completed, set up for himself. It is not easy to ascertain what his opinions were, as only a few fragments of his numerous writings have been preserved; but he was accused of Atheism, and apparently on good ground, as he is said to have regarded all questions relative to the nature of the gods and divine providence as indifferent. He died at Chalcis in Eubœa about B.C. 241. ——Another BION, who lived at Abdera, and belonged to the family of Democritus, distinguished himself as a mathematician, and is said by Diogenes Laertius to have been the first who taught that there were countries in the world where the year consists only of a single day and a single night, each lasting for six months. He must therefore have been acquainted both with the spherical form of the globe and the obliquity of the ecliptic. Unfortunately nothing more is known of his history.

BIOPLASM. See PROTOPLASM.

BIOT, EDOUARD CONSTANT, an eminent Chinese scholar, son of Jean Baptiste Biot, celebrated for his mathematical, physical, and astronomical labours, was born at Paris in 1803, attended the College of Louis XIV., and in 1822 became a pupil in the Polytechnic School. After accompanying his father on a scientific tour to Italy in 1824–25, he undertook the construction of a railway from Lyons to St. Etienne, the first in France. Having fallen into bad health he retired from active life, and began to devote his leisure to the study of the Chinese, a subject which he prosecuted with an industry which certainly shortened his life. He died in 1850, after he had succeeded to Joubert's place in the Academy of Inscriptions. He was the author of the interesting work, De l'Abolition de l'Esclavage Ancienne en Occident (Paris, 1840). As the fruit of his studies on China he published numerous articles in the Journal des Savants and Journal Asiatique, as well as several larger works, more especially Dictionnaire des Noms, Anciens et Modernes, des Villes et Arrondissements de l'Empire Chinois (Paris, 1842), and Essai sur l'Histoire de l'Instruction Publique en Chine. His varied acquirements enabled him to draw and work up from the Chinese documents materials which a mere philologist would have been unable to turn to any good account. Besides translations of Chinese works—for example, the Historico-Chronological Tchou-chou-ni-kien (Paris, 1842), and the Astronomical Tcheou-pei—he wrote a Notice sur quelques Procedés Industriels connus en Chine, au 17me Siècle; an Examen de diverses Series de Facts relatifs au Climat de la Chine; and Chine et Indo-Chine. The printing of his translation of the Chinese Imperial Geography, Theou-li, was interrupted for some time by his death.

BIOT, JEAN BAPTISTE, one of the most celebrated mathematicians and physicists of the nineteenth century, was born at Paris, 21st April, 1774, and died there 3d Feb. 1862. He was educated in the Polytechnic School, and at first entered the artillery service, but soon left it in order to devote himself to the study of mathematics and the natural sciences. After teaching physics for some years at Beauvais, he became professor of the same subject in the College de France in 1800, and in 1803 was elected a member of the Academy of Sciences. In 1804 he was appointed to the Observatory of Paris, and in 1806 was made member of the Bureau des Longitudes. In 1809 he became also professor of physical astronomy in the University of Paris. With the exception of three journeys, undertaken in connection with the measurement of a degree of the meridian—viz. to Spain in 1806–8, to Scotland, Orkneys, and Shetland in 1817, and to Spain and Italy in 1824–25—his whole life was quietly passed in study and teaching. He published some excellent text-books, which became widely known beyond France, such as the Essai de Géométrie Analytique; Traité de Physique Expérimentale et Mathématique; and Traité Élémentaire de Physique Expérimentale, as well as works on the astronomy of the ancient Egyptians, Indians, and Chinese. His most valuable contributions to science, however, are chiefly contained in communications to learned societies and periodicals. There are few branches of physics which were not advanced by his labours; and in optics especially he made some valuable investigations, particularly in connection with refraction and polarization.

BIR, or BEER (anciently *Birtha*), a town, Asiatic Turkey, 62 miles N.E. Aleppo, on the side of a steep hill on the left bank of the Euphrates, which is here about 600 yards wide, and 10 to 12 feet deep. The town is surrounded on the land side by a wall, with towers at the angles, and pierced with loop-holes. The streets are narrow but clean. In the centre, on a steep rock, is an old ruined fortification. The rocks on which Bir is built are of chalk, and the houses of the same material, the whiteness of which in bright sunshine is painful to the eyes. Bir has long been the point where caravans and travellers from Aleppo to Orfah, Diarbekir, Bagdad, and Persia, cross the Euphrates. Pop. 5000 to 6000.

BIRAGUE, RENÉ DE, born at Milan of a distinguished family in 1507, incurred the hostility of Louis Sforza the duke, and sought an asylum in France, where Francis I. received him favourably, made him councillor of the Parliament of Paris, and governor of Lyonnais, and sent him to the Council of Trent. Under Charles IX. his advancement was still more rapid, and in 1570 he was made keeper of the seals. In this capacity he was a party in the secret council at which the massacre of St. Bartholomew was organized. His character well fitted him to be a leader in that infamous atrocity; and he was generally believed to have repeatedly employed poison to rid himself and his patroness, Catharine de'Medici, of persons who stood in their way. With all his wickedness, however, he managed to play the hypocrite, and with so much success that he was made a cardinal in 1578, and besides held the bishopric of Lavaur and several rich abbeys. He died Chancellor of France in 1583.

BIRCH (*Betula*), a genus of trees belonging to the natural order Betulaceæ, which comprises only the birches and alders. The principal habitats of the trees of this order are Europe, Northern Asia, the Himalayas, and North America. The common birch is indigenous throughout the north, and on high situations in the south of Europe. It is extremely hardy, and only one or two other species of trees approach so near to the north pole. There are two varieties natives of Britain, *Betula alba*, and *B. alba pendula*, or weeping-birch; the latter is by far the more valuable and ornamental. When a plant it may readily be distinguished by the touch, its bark being covered over with rough exudations, while that of the common tree is soft and velvety. Each variety

is found exclusively in some districts, but frequently they are interspersed. Throughout the most remote parts of the Highlands of Scotland the birch is often found in extensive coppice on rocky elevations, where no other ligneous plant is to be met with. It also stands in glens and ravines, adorning the margins of lakes and rivers, where the silvery whiteness of its trunk and the light and airy habit of its spray form scenes beautiful and interesting, even in the absence of every other tree. Though it is often found associated with the alder on swampy ground, yet few trees more successfully resist drought. Adapting itself to various soils and situations, it possesses a wider range than any other plant. It is well suited to form a cover on ground from which Scotch pine timber has been recently removed; the exuviæ, which always overspread such places, though hostile to plants in general, are favourable to the birch, which commonly springs up and becomes the successor of the pine. The common tree, where it grows wild, attains a height of about 30 feet, and the weeping variety about 40 feet; but both sorts rise to a much greater height when formed into plantations, particularly when interspersed with other trees. Some of the finest weeping-birches in Britain stand on the banks of the river Findhorn, near Forres, in Morayshire; these are 60 feet high, with trunks upwards of 2 feet in diameter, and display pendent masses of spray 10 feet in length, adding a graceful variety of verdure to scenes in themselves of great beauty. Although the birch is considered by no means a valuable tree, yet its wood, which is light in colour, and firm and tough in texture, is used for a variety of purposes. Not long ago, in many parts of the Highlands, the birch may be said to have been the universal wood, and was used by the Highlanders for every purpose. They made their beds, chairs, tables, dishes, and spoons of it, and even manufactured ropes and horse-harness by heating and twisting its spray. The brushwood is used in forming wicker fences to prevent the inroads of cattle and sheep, in thatching cottages, and in forming brooms or besoms. The wood is largely used for fish-casks and hoops, and for smoking hams and herrings. Turners use it for trenchers, bowls, ladles, and other wooden ware. Ox-yokes, small screws, women's shoe-heels, pattens, and in France wooden shoes are made of it. Birch-trees are not unfrequently planted along with hazels, for the purpose of procuring wood to be converted into charcoal for forges. This charcoal is much esteemed, and the soot which is formed on burning the wood constitutes a good black substance for printers' ink. Nearly all the other parts are applicable to useful purposes. The bark is employed in the tanning of leather, and by fishermen for preserving their nets and cordage. The navigators of the river Volga construct of it portable boats, cradles, &c. The North American Indians use it for canoes, boxes, buckets, baskets, kettles, and dishes, curiously joining it together with threads made of roots of the cedar-tree. It is serviceable in dyeing a yellow colour. In Norway it is dried, ground, mixed with meal, and boiled with other food for swine. The houses or huts in many parts of the N. of Europe are covered with the outward and thicker part of the bark, instead of slates or tiles. It is spun into a coarse kind of ropes, woven into shoes and hats, and in Kamtschatka even made into drinking-cups. The Laplanders fasten together large pieces of it to keep off the rain. Abounding in resinous matter, slices of the bark are sometimes tied together to make torches. During a scarcity of corn it has, in several instances, been ground with bread corn, and successfully used as food for men. The leaves afford a yellow dye. The sap, from the amount of sugar it contains, affords a kind of agreeable wine. Birch-wine is produced by the tree being tapped by boring a hole in the trunk, during warm weather, in the end of spring or beginning of summer, when the sap runs most copiously. It is recorded that during the siege of Hamburg, in 1814, many birch-trees in that vicinity were destroyed in this manner by the Russian soldiers. The dwarf birch, *Betula nana*, is a low shrub, a native of Scotland and of some other countries in Europe. Several kinds of the tree with large leaves, and likely to attain a greater size in this country than any of the native sorts, have been introduced into Britain from America; among them *Betula lenta*, or the cherry-birch of Pennsylvania, appears to yield the largest and most valuable timber. Its wood is fine-grained, and is often made into furniture. The black birch (*B. nigra*), of the same country, also produces hard and valuable timber.

BIRCH, THOMAS, an industrious historian and biographer of the eighteenth century. He was born in London in 1705, and his father, who was a Quaker, practised the occupation of a coffee-mill maker, to which the son also was destined. His early taste for reading induced him to prefer a literary life, which he was permitted to choose on condition of supporting himself by his own exertions. He accordingly, after some previous tuition, became usher in three different schools, and then went to Ireland with Dean Smedley. Having left the Quakers, he took orders in the church in 1730, and obtained in 1732 a living in Essex, through the patronage of the attorney-general, afterwards Lord Hardwicke. In 1734 he engaged with some coadjutors in writing the General Historical and Critical Dictionary, founded on that of Bayle, and completed, in ten vols. fol., in 1741. He subsequently obtained various preferments in the church. In January, 1766, he was killed by a fall from his horse on the road between London and Hampstead. Birch had formed very extensive manuscript collections, which, together with his library of printed books, he bequeathed to the British Museum. He produced a large number of historical and biographical works in the course of his laborious life, and served as one of the pioneers of literature. He collected fully and faithfully, but without much discrimination, materials relating to the various subjects of his research which are calculated to afford important assistance to writers possessed of more taste and judgment. Johnson was repeatedly obliged to him for literary information, and for many years corresponded with him.

BIRD, EDWARD, R.A., an English painter, born at Wolverhampton, 1772, died at Bristol, 1819. He excelled in comic subjects. The Marquis of Stafford patronized him. He was appointed historical painter to the Princess Charlotte of Wales.

BIRD, JOHN, a celebrated mathematical instrument maker, born in 1709, died in 1776. Among his instruments are the celebrated Greenwich quadrant, which was used by Bradley and Maskelyne, and the mural quadrant of the École Militaire at Paris, employed by D'Agelet and Lalande in determining the declinations of 50,000 stars. His superiority to all other makers of his day is strikingly established by the fact that in 1767 the Board of Longitude paid him £500 on his agreeing to take an apprentice, instruct other persons as required, and furnish upon oath descriptions and plates of his methods.——WILLIAM, one of the most eminent composers of sacred music, was born about 1540, became a pupil of Thomas Tallis, and jointly with his master was appointed organist to Queen Elizabeth. He died in 1623. That he was one of the greatest masters of his art is generally acknowledged; and were any proof required, it is only necessary to refer to his

Non Nobis Domine, which, after the lapse of two centuries and a half, maintains its ground almost without a rival.

BIRD-CATCHING, the art of taking birds or wild fowl. Birds of all kinds were formerly very generally, and are still in some districts, caught by intoxication. The substance usually employed is a mixture of the lees of wine and hemlock-juice, employed as a menstruum for a certain portion of wheat which is to be steeped in it, and afterwards thrown over the spot where the birds in question are known to resort: having eaten of this mixture, they will soon become inebriated, and drop down without sense.

Pheasants are often taken by night in a way not dissimilar: the flame of sulphur being held under the trees on which they are observed to perch, in consequence of which they fall down in the same manner from suffocation.

Birds are also taken by a lamp or lantern, hand-bell and net; which method is employed in open champaign countries, and in stubble-fields, especially wheat stubble-fields, from the middle of October to the end of March. The method is as follows:—At night, when the air is mild, and the moon does not shine, take a low bell, which must be of a deep and hollow sound, and of such a size that a man may carry it conveniently with one hand; its sound being that of a sheep's bell while it feeds: you must also have a box, much like a large lantern, about 1½ foot square, big enough for two or three great lights to be set in it; let the box be lined with tin, with one side open to cast forth the light: fix this box to your breast to carry before you, and the light will extend a great distance, whereby you may see anything that is on the ground, and consequently the birds that roost there. Have two men with you, one on each side; but a little behind you, that they may not be within the réflection of the light that the lantern or box casts forth; and each of them must be provided with a hand-net of about 3 or 4 feet square, fixed to a long stick, and carried in their hands; so that when either of them sees any bird on his side he may lay his net over them, and take them up with as little noise and bustle as possible. It is to be observed that the sound of the low bell makes the birds lie close and not dare to stir while you put your nets over them, at the same time that the light is so terrible to them as to overpower them equally. If you practise this sport by yourself, carry the low bell in one hand, as before directed, and in the other a hand-net, about 2 feet broad and 3 feet long, with a handle to it, to be laid on them as you spy them out. Some like this way better than the former. There are some who, instead of fixing the light to their breast as aforesaid, tie the low bell to their girdle, by a string which hangs to their knees, and the motions of which cause the bell to strike; they carry the light in their hand, extending the arm before them; but the lantern or box must not be so large as that which is fixed to the breast.

Birds are also taken by night in open countries, with a long trammel-net, much like the net used for the low bell, both in shape, size, and mesh. This net is to be spread upon the ground; the lower end being plumbed should lie close, while the upper end being kept suspended at the two corners, it is trailed along the road at about a yard in height. Then at each end of the net must be carried several blazing lights of fire, such as have been described before; by which the attendants, with long poles, must raise up the birds as they proceed, and as they ascend under the nets take them.

Birds, and especially of the smaller kinds, are also taken by bird-lime. In using bird-lime take your rods, and warm them gently over the fire; next take your lime and wind it about the top of your rods, then draw your rods asunder from one another, and close them again, continually plying and working them together, till by smearing one upon another, you have equally bestowed on each rod a sufficient quantity of lime. If you lime any strings, do it when the lime is very hot and thin, besmearing the strings on all sides by folding them together and unfolding them again. Straws must likewise be limed when the lime is very hot, taking as many as you can well grasp in your hand, and tossing and working them before the fire till they are all besmeared, every straw having its due proportion of lime; having so done, put them up in cases of leather for use. With the twigs thus limed you may catch snipes and field-fares; but the smaller birds which frequent hedges and ditches may be taken with much greater ease. For this last purpose cut down the main branch or bough of any bushy tree, whose branches and twigs are long, thick, smooth, and straight, without either pricks or knots, of which the willow or birch tree are the best; when you have picked it and trimmed it from all superfluities, and made the twigs neat and clean, take the best bird-lime, well mixed and wrought together with goose or capon's grease, and having warmed it, lime every twig therewith within four fingers of the bottom. The body whence the branches have their rise must be untouched with lime. Some delicacy is necessary in smearing the twigs; for if daubed too much, it will give distaste to the birds. Yet let none want its proportion, or have any part left bare which ought to be touched: for as too much will deter them from coming, so too little will not hold them when they are come. Having so done, place your bush in some quickset or dead hedge near the town's-end, back-yards, old houses, or the like; for these are the resort of small birds in the spring-time: in the summer and harvest, in groves, bushes, or white-thorn trees, quickset hedges near corn-fields, fruit-trees, flax and hemp lands: and in the winter about houses, hovels, barns, stacks, or those places where ricks of corn, or scattered chaff, &c., attract them.

As near as you can to any of those haunts plant your lime-bush, and place yourself also at a convenient distance undiscovered, imitating with your mouth several notes of birds, which you must learn by frequent practice, walking the fields for that purpose very often, observing the variety of different birds' sounds, especially those they call one another by. Some have been so expert therein, that they could imitate the notes of twenty sorts of birds at least, by which they have caught ten birds to another's one who was ignorant in this art. If you cannot attain it by your industry, you must buy a bird-call, of which there are several sorts, and easy to be made of wood, horn, or cane. Having learned first how to use this call, you should sit and call the birds to you, and when any of them light on your bush, do not step out to them till you see them sufficiently entangled; neither is it requisite to run for every single bird, but let them alone till more come, for the fluttering is as good as a decoy to entice them. This exercise you may use from sun-rising till ten o'clock in the morning, and from one till almost sunset. You may also take small birds with lime-twigs only, and without the bush.

There is another way of taking birds with lime-twigs, by placing near them a decoy or two made of living bats, placing them aloft that they may be visible to the birds thereabouts, which will no sooner perceive them than every bird will come and gaze, wondering at the strangeness of the sight, and having no other convenient lighting-place than where the lime-twigs are, you may take what number you like

of them. Yet the owl is a far better decoy than the bat, being bigger and more easily to be perceived; besides he is never seen abroad, without being followed and persecuted by all the birds that are near. If you have not a live bat or owl, their skins will serve as well, stuffed, and will last you twenty years; there are some have used an owl cut in wood, and naturally painted, with great success.

Another method of bird-catching is that by means of nets and call-birds, which is practised chiefly in March and October, when the birds migrate or *fly*. The nets employed are a most ingenious piece of mechanism; generally 12½ yards long, and 2½ yards wide; and no one, on bare inspection, would imagine that a bird could be caught by the nets flapping over each other, till he becomes an eye-witness of the puller's success.

The bird-catcher, who has a proper apparatus for this purpose, generally carries with him five or six linnets (of which more are caught than any other kind of singing bird), two goldfinches, two greenfinches, one woodlark, one red-poll, a yellow-hammer, titlark, and aberdevine, and perhaps a bullfinch; these are placed at small distances from the nets in little cages. He has, besides, what are called flur-birds, which are placed within the nets, are raised upon the flur or movable perch, and gently let down at the time the wild bird approaches them. These generally consist of the linnet, the goldfinch, and the greenfinch, which are secured to the flur by what is called a brace or movable bandage, a contrivance that secures the birds without doing any injury to their plumage.

When the bird-catcher has laid his nets, he disposes of his call-birds at proper intervals. It must be owned, their sight and hearing infinitely excel those of the bird-catcher. The instant that wild birds are perceived, notice is given by one to the rest of the call-birds, as it is by the first hound that hits on the scent to the rest of the pack; after which follows the same sort of tumultuous ecstasy and joy. The call-birds, while the bird is at a distance, do not sing as a bird does in a chamber; they invite the wild ones by what the bird-catchers call short jerks, which, when the birds are good, may be heard at a great distance. The ascendency by this call or invitation is so great, that the wild bird is stopped in its course of flight; and, if not already acquainted with the nets, lights boldly within 20 yards of perhaps three or four bird-catchers, on a spot which otherwise it would not have taken the least notice of. Nay, it frequently happens, that if half a flock only are caught, the remaining half will immediately afterwards light in the nets, and share the same fate; and should only one bird escape, that bird will suffer itself to be pulled at till it is caught; so fascinating a power have the call-birds.

The nightingale is not a bird of flight, in the sense the bird-catchers use this term. Like the robin, wren, and many other singing birds, it only moves from hedge to hedge, and does not take the periodical flights in October and March. The persons who catch these birds make use of small trap-nets, without call-birds; and are considered as inferior in dignity to other bird-catchers, who will not rank with them. The arrival of the nightingale is expected by the trappers in the neighbourhood of London the first week in April: at the beginning, none but cocks are taken; but in a few days the hens make their appearance, generally by themselves, though sometimes a few males come along with them. The latter are distinguished from the females not only by their superior size, but by a great swelling of their vent, which commences on the first arrival of the hens. They are caught in a net-trap, the bottom of which is surrounded with an iron ring; the net itself is rather larger than a cabbage-net. When the trappers hear or see them, they strew some fresh mould under the place, and bait the trap with a meal-worm from the baker's shop. Ten or a dozen nightingales have been thus caught in the course of a day.

The common way of taking larks, of which so many are used at our tables, is in the night, with those nets which are called trammels. These are usually made of 36 yards in length, and about 6 yards over, with six ribs of packthread, which at the ends are put upon poles of about 16 feet long, and made less at each end. These are to be drawn over the ground by two men, and every five or six steps the net is made to touch the ground, otherwise it will pass over the birds without touching them, and they will escape. When they are felt to fly up against the net, it is clapped down, and then all are safe that are under it. The darkest nights are most proper for this sport; and the net will not only take larks, but all other birds that roost on the ground; among which are woodcocks, snipes, partridges, quails, field-fares, and several others. In the depth of winter, people sometimes take great numbers of larks by nooses of horse-hair, the method being as follows: take 100 or 200 yards of packthread; fasten at every sixth inch a noose made of double horse-hair; at every 20 yards the line is to be pegged down to the ground, and so left ready to take them. The time to use this is when the ground is covered with snow, and the larks are to be allured to it by some white oats scattered all the way among the nooses. They must be taken away as soon as three or four are hung, otherwise the rest will be frightened; but though the others are scared away, just where the sportsman comes, they will be feeding at the other end of the line, and the sport may be thus continued for a long time.—Those caught in the day are taken in clap-nets of 15 yards long, and 2½ in breadth; and are enticed within their reach by means of bits of looking-glass fixed in a piece of wood, and placed in the middle of the nets, which are put in a quick whirling motion, by a string the larker commands; he also makes use of a decoy lark. These nets are used only till the 14th November: for the larks will not dare to frolic in the air, except in fine sunny weather; and of course cannot be inveigled into the snare. When the weather grows gloomy, the larker changes his engine, and makes use of a trammel net, 27 or 28 feet long, and 5 broad; which is put on two poles 18 feet long, and carried by men under each arm, who pass over the fields, and quarter the ground as a setting dog when they hear or feel a lark hit the net, they drop it down, and by those means the birds are secured.

None of these methods is attended with any danger: but fowling as practised among the rocks and precipices of Orkney, Shetland, the Farões, and other northern islands and coasts, is a most hazardous occupation. In the Orkneys and Shetland the precipices are sometimes several hundred feet in height, their faces roughened with shelves or ledges sufficient only for the birds to rest and lay their eggs on. To these the dauntless fowlers will ascend, pass intrepidly from the one to the other, collect the eggs and birds, and descend with the same indifference. In most places the attempt is made from above: the fowler being lowered from the slope contiguous to the brink by a rope, sometimes made of straw, sometimes of the bristles of the hog, or of twisted thongs of cow-hide. They prefer the last two even to ropes of hemp, as they are not liable to be cut by the sharpness of the rocks; the first is apt to untwist. They trust themselves to a single assistant, who lets his companion down, and holds the rope, depending on his strength alone; which often

fails, and the adventurer is sure to be dashed to pieces, or drowned in the subjacent sea. The rope is often shifted from place to place, with the impending weight of the fowler and his booty. The person above receives signals for the purpose, his associate being far out of sight. Here we should not omit to mention the way in which the birds are taken from the Holm of Noss, a vast rock severed from the Isle of Noss by some unknown convulsion, and only about 16 fathoms distant. It is of the same stupendous height as the opposite precipice, with a raging sea between; so that the intervening chasm is of matchless horror. Some adventurous climber has reached the rock in a boat, gained the height, and fastened several stakes on the small portion of earth which is to be found on the top; corresponding stakes are placed on the edge of the opposite cliffs. A rope is fixed on the stakes on both sides, along which a machine called a cradle is contrived to slide; and, by the help of a small parallel cord, fastened in like manner, the adventurer wafts himself over, and returns with his booty.

The manner by which bird-catching in the Faröe Islands is performed is similar, but even more hazardous. The cliffs there are often 200 fathoms in height, and are attempted from above and below. In the first case, the fowlers provide themselves with a rope from 80 to 100 fathoms in length. The fowler fastens one end about his waist and between his legs, recommends himself to the protection of the Almighty, and is lowered down by six others, who place a piece of timber on the margin of the rock, to preserve the rope from wearing against the sharp edge. They have besides a small line fastened to the body of the adventurer, by which he gives signals that they may lower or raise him, or shift him from place to place. The last operation is attended with great danger, by the loosening of the stones, which often fall on his head, and would infallibly destroy him, were it not protected by a strong thick cap; but even that is found unequal to save him against the weight of the larger fragments of rock. The dexterity of these men is amazing; they will place their feet against the front of the precipice, and dart themselves some fathoms from it, with a cool eye survey the places where the birds nestle, and again shoot into their haunts. In some places the birds lodge in deep recesses. The fowler will alight there, disengage himself from the rope, fix it to a stone, and at his leisure collect the booty, fasten it to his girdle, and resume his pendulous seat. At times he will again spring from the rock, and, in that attitude, with a fowling-net placed at the end of a staff, catch the old birds which are flying to and from their retreats. When he has finished his dreadful task, he gives a signal to his friends above, who pull him up, and share the hard-earned profit. The feathers are preserved for exportation: the flesh is partly eaten fresh, but the greater portion is dried for provision during the winter.

The method of fowling from below has also its share of danger. The party go on the expedition in a boat; and when they have attained the base of the precipice, one of the most daring, having fastened a rope about his waist, and furnished himself with a long pole, with an iron hook at one end, either climbs or is thrust up by his companions, to the next footing spot he can reach. He, by means of the rope, brings up one of the boat's crew; the rest are drawn up in the same manner, and each is furnished with his rope and fowling-staff. They then continue their progress upwards in the same manner, till they arrive at the region of birds; and wander about the face of the cliff in search of them. They then act in pairs; one fastens himself to the end of his associate's rope, and, in places where birds have nestled beneath his footing, he permits himself to be lowered down, depending for his security on the strength of his companion, who has to haul him up again; but it sometimes happens that the person above is overpowered by the weight, and both inevitably perish. They fling the fowl into the boat which attends their motions and receives the booty. They often pass seven or eight days in this tremendous employment, and lodge in the cavities which they find in the face of the precipice.

In some remote parts of Russia there is practised a singular invention for taking great quantities of gelinottes or grouse. They choose the most open places in the birch woods; and there they plant long forks in the earth opposite the larger trees. On these forks is laid a horizonal stick, gallows-wise, to which are tied small bundles of ears of corn. At a small distance from this part of the contrivance is a kind of large funnel, or inverted cone, made with long birch twigs, thin and flexible, the lower extremities of which are stuck in the earth, very near to one another; but by spreading towards the top, form there an opening of above a yard in diameter. In this opening is placed a wheel, made of two circles that intersect each other, and are surrounded with straw and ears of corn. This wheel turns on an axis fastened to the sides of the funnel, in such a manner, that there is room enough between the sticks of the cone and circles to admit of the wheel's turning freely about. The birds first perch upon the transverse stick near the tree; and when they have a mind to fall upon the corn tied to the wheel, they must necessarily stand upon one of the projecting parts of the circles of which it is composed. At that instant the wheel turns, and the gelinotte falls, head foremost, to the bottom of the trap, which is there so contracted that he cannot get out. They sometimes find the machine half full of gelinottes.

The following method of netting or catching wild pigeons is eagerly pursued as a diversion in different parts of Italy, particularly by the inhabitants of Cava in the Hither Principato, and is thus described by Mr. Swinburne. The people 'assemble in parties; and if any stranger chance to stray to their rendezvous, give him a most cordial welcome. I am not in the least surprised,' says Mr. Swinburne, 'at their passionate fondness for this sport, as I found it extremely bewitching, keeping the attention constantly alive, and the springs of the mind pleasingly agitated by expectation; the situations where the toils are spread are incomparably beautiful, the air is pure and balsamic, and everything around breathes health and satisfaction. When the periodical flights of stock-doves return from the northern and western parts of Europe to gain warmer regions for their winter abode, the fowler repairs to the mountain, and spreads his nets across the intermediate hollows, the passes through which the birds direct their course, to avoid unnecessary elevation in their flight. These nets are hung upon a row of large trees planted for the purpose. The branches being very thick and close at top, and the trunk lofty and bare, a great opening is left below for the toils, which reach to the ground; and, by means of pulleys, fall in a heap with the least effort. Sometimes they are extended upon poles that exceed the height of the trees. At a small distance is a lofty circular turret, like a column with a little capital or cap, upon which a man is stationed to watch the approach of the game. As he commands a free view over all the country, and practice has made his sight as acute as that of the lynx, he descries the birds at a wonderful distance. The doves advance with great velocity; but the alert watch-

man is prepared for them; and just as they approach his post, hurls a stone above them with a sling: upon this, the whole flock, whose fears have birds of prey for their great object, supposing the stone to be an enemy of that kind ready to pounce upon them, dart down like lightning to shun the blow by passing under the trees; but there they rush into the jaws of death, by dashing against the net, which instantly drops, and so entangles them that not one of them can escape the active hands of the fowler. These birds are sometimes taken by dozens at one fall, and are accounted fine eating. The dexterity with which the slingers manage their weapon is very remarkable; they throw the stone to a great height, without any violent effort, and without whirling the sling round before they discharge the pellet. In the Pyrenean mountains, where the same diversion is followed, the watchman uses a bow and arrow, trimmed with the feathers of a hawk.' For the capture of water-fowl, see DECOY.

BIRDLIME exudes spontaneously from certain plants, and is obtained artificially from the middle bark of the holly. Its colour is greenish, its flavour sour, and it is gluey, shining, and tenacious. The natural is more adhesive than the artificial birdlime. See BIRD-CATCHING.

BIRD OF PARADISE. See PARADISE (BIRD OF).

BIRDS. See ORNITHOLOGY.

BIRD'S-EYE VIEW. See PERSPECTIVE.

BIRDS' NEST. The *Hirundo esculenta*, or *salangane*, a species of swallow, the nests of which are used as an article of luxury among the Chinese, is found in the Indian seas. They are particularly abundant in Sumatra, especially about Croe, near the S. end of the island. The nest has the shape of a common swallow's nest, is about the size of a goose's egg, is found in caves, particularly on the sea-shore, and has the appearance of fibrous, imperfectly concocted isinglass. More or less of this substance is contained in the nests of all swallows of that region. The manner in which this substance is procured was long doubtful, but it seems now to be generally admitted that it is a marine plant gathered by the birds, and brought from considerable distances. The Chinese collect the nests, and sell them to all parts of the world. Dissolved in broths, &c., they make a delicious jelly. The finest are those obtained before the nest has been contaminated by the young birds; they are pure white, and are scarce and valuable. The inferior ones are dark, streaked with blood, or mixed with feathers: they are chiefly converted into glue. Some of the caverns in which they are built are difficult of access and dangerous to climb, so that none can collect the nests but persons accustomed to the trade from their youth.

The following account of the traffic in these birds' nests we extract from Mr. Crawfurd's excellent work on the Eastern Archipelago.

'The best nests are those obtained in deep, damp caves, and such as are taken before the birds have laid their eggs. The coarsest are those obtained after the young have been fledged. The finest nests are the whitest, that is, those taken before the nest has been rendered impure by the food and *fæces* of the young birds. They are taken twice a year, and if regularly collected, and no unusual injury be offered to the caverns, will produce very equally, the quantity being very little, if at all, improved by the caves being left altogether unmolested for a year or two. Some of the caverns are extremely difficult of access, and the nests can only be collected by persons accustomed from their youth to the office. The most remarkable and productive caves in Java, of which I superintended a moiety of the collection for several years, are those of Karang-bolang, in the province of Baglen, on the S. coast of the island. Here the caves are only to be approached by a perpendicular descent of many hundred feet by ladders of bamboo and rattan over a sea rolling violently against the rocks. When the mouth of the cavern is attained, the perilous office of taking the nests must often be performed with torchlight, by penetrating into recesses of the rock, where the slightest trip would be instantly fatal to the adventurers, who see nothing below them but the turbulent surf making its way into the chasms of the rock.

'The only preparation which the birds' nests undergo is that of simple drying, without direct exposure to the sun, after which they are packed in small boxes, usually of half a picul. They are assorted for the Chinese market into three kinds, according to their qualities, distinguished into *first*, or *best*, *second*, and *third* qualities. Caverns that are regularly managed will afford in one hundred parts fifty-three three-tenth parts of those of the first quality, thirty-five parts of those of the second, and eleven seven-tenth parts of those of the third.

'The common prices for birds' nests at Canton are for the first sort no less than 3500 Spanish dollars the picul, or £5, 18*s*. 1½*d*. per pound; for the second 2800 Spanish dollars per picul; and for the third 1600 Spanish dollars. From these prices it is sufficiently evident that the birds' nests are no more than an article of expensive luxury. They are consumed only by the great; and indeed the best part is sent to the capital for the consumption of the court. The sensual Chinese use them under the imagination that they are powerfully stimulating and tonic; but it is probable that their most valuable quality is their being perfectly harmless. The people of Japan, who so much resemble the Chinese in many of their habits, have no taste for the edible nests; and how the latter acquired a taste for this foreign commodity is no less singular than their persevering in it. Among the western nations there is nothing parallel to it, unless we except the whimsical estimation in which the Romans held some articles of luxury, remarkable for their scarcity rather than for any qualities ascribed to them.'

Mr. Crawfurd estimated the whole quantity of birds' nests exported from the Archipelago at 242,400 lbs., worth £284,290. A more recent estimate makes the quantity exported only 125,000 lbs. The best sort are said to cost from 2500 to 3800 dollars per picul of 133 lbs., or nearly twice as much as their weight in silver; those of the second quality are worth from 1200 to 1600 dollars per picul; the third sort are worth only from 120 to 200 dollars per picul. A large quantity of the best sort is annually sent to Pekin for the use of the imperial court.

BIREN, or BIRON, ERNEST JOHN VON, Duke of Courland, born in 1687, was the grandson of a groom of James, duke of Courland, and the son of a Courlandish proprietor of the name of Bühren. He studied at Königsberg, and endeavoured to conceal the meanness of his origin by raising himself in the favour of the great. His agreeable person and very cultivated mind procured him the highest favour of Anna, duchess of Courland, and niece of Peter the Great of Russia; but he was unsuccessful in his attempt to obtain admission among the Courlandish nobility. When Anna ascended the Russian throne (1730), Biren, in spite of the conditions to which the empress had consented (one of which was not to bring him with her to Russia), was loaded by her with honours, and introduced at the Russian court. Here he assumed the name and coat of arms of the Dukes of Biron in France, and governed under the name of his mistress. Fierce and haughty by nature,

he indulged his hatred against the rivals of his ambition. The Princes Dolgorucky were his first victims. He caused 11,000 persons to be put to death, and double that number to be exiled. It is said that the empress often threw herself at his feet to induce him to lay aside his severity, but that neither her entreaties nor her tears were able to move him. The firmness of his character, however, introduced vigour and activity into all branches of the administration throughout the great empire. In 1737 Anna forced the Courlanders to choose her favourite (who had in 1722 married a Courlandish lady of the family of Trotta by the name of Treyden) for their duke. After having declared Prince Ivan her successor, she appointed Biren, according to his wish, regent. Anna died, Oct. 28, 1740. The new regent acted with prudence and moderation. But a secret conspiracy was soon formed against him. Field-marshal Münnich, with the consent of the young emperor's mother, caused him to be arrested in his bed during the night of Nov. 19, 1740, by Manstein, and to be confined in the Castle of Schlüsselburg. He was subjected to a trial; but no proofs of the projects which he was accused of having formed for the advantage of his family being discovered, the sentence of death was changed into that of imprisonment for life, and his fortune was declared confiscated. Together with his family he was transported to Pelym, in Siberia, and thrown into a prison, of which Münnich himself had furnished the plan. In the following year Elizabeth, daughter of Peter the Great, being raised to the Russian throne by a new revolution, Biren was recalled, Dec. 20, 1741, and Münnich was obliged to occupy his prison. At Kasan the sledges met; the travellers recognized each other, and proceeded on their way without interchanging a word. The family of Biren afterwards lived in a very respectable condition at Jaroslav. After a subsequent exile of twenty-two years the duke as well as Münnich was recalled in 1762 by Peter III. When Catherine II. ascended the throne the Duchy of Courland was restored to Biren in 1763. He governed with wisdom and lenity, transferred the government to his eldest son Peter, and closed his restless life, 1772.

BIRKBECK, GEORGE, born at Settle, in Yorkshire, in 1776, pursued his medical studies at Edinburgh, and having early devoted his leisure to mechanical and scientific subjects, became a successful candidate for the chair of natural and experimental philosophy in the Andersonian Institute at Glasgow, and in 1799 delivered his first course of lectures. The following year he proposed to give a gratuitous course of lectures to mechanics. The directors regarded the proposal as visionary, but Birkbeck persevered, and a circular was sent round to the different manufactories of the town, offering admission to the mechanics' class to their most intelligent workmen. At first only seventy-five persons attended, but at every succeeding lecture the number increased so much that the fourth was attended by 500, and it became necessary to limit the number of tickets from want of accommodation. This was the first attempt to establish mechanics' institutes, and to Dr. Birkbeck the honour of being their founder unquestionably belongs. In 1806 he settled as a physician in London, and was soon engaged in an extensive practice; but the means of extending scientific knowledge to mechanics was ever present to his thoughts, and in 1823 he had the happiness of being elected president of the London Mechanics' Institution, and of seeing similar institutions rising up and prospering in all the larger towns of the kingdom. He died in 1841.

BIRKENHEAD, a town, England, Cheshire, on the estuary of the Mersey, opposite to Liverpool. It has risen up within a few years with remarkable rapidity. It owes its prosperity to the erection of commodious docks, and the railways communicating with them. It has five principal streets, running from N.W. to S.E., crossed at right angles by a number of shorter ones; a handsome square, having an area of 6½ acres, 4 of which are inclosed and planted with shrubbery; a townhouse that cost £10,000; market which cost £30,000; slaughter-houses on the most approved plan; and ranges of dwelling-houses for workmen, unusually complete in their accommodation and in all their appointments. The system of drainage and sewerage is also singularly complete. The width of courts is regulated, and the streets are generally wider than in the best parts of most towns. It is well paved, and abundantly supplied with water. There is here a theological college, where young men are prepared as clergymen for foreign missions; a free public library, industrial schools, &c. The benevolent institutions comprise an hospital or infirmary, a lying-in-hospital, and a dispensary. In the N.W. part of the township, on rising ground, a large public park, beautifully laid out, has been formed, having a noble carriage entrance, in the Ionic style. Its magnificent docks, however, form the great distinguishing features of Birkenhead, and are the sources of its prosperity. The dock warehouses are on an equally magnificent scale. The communication with Liverpool is kept up by fine large steamboats, which ply from each side of the river every ten minutes. Birkenhead is connected by railway with Chester, and thence with all parts of England. The rails are brought round all the quays of the docks. It returns a member to Parliament. Pop. in 1821, 236; in 1851, 51,649; in 1871, 65,980.

BIRMAH, BRITISH. In 1852 a war broke out between Great Britain and the Birman Empire for wrongs done to British merchants at Rangoon. The result was the concession to Britain in 1853 of the maritime provinces, which, with the long line of sea-coast known as Tenasserim, were united in one local administration under the title of British Birmah in 1862. The province possesses 900 miles of sea-coast, and an area of 98,000 square miles. The following figures give the leading statistics for 1869–70:—

Provinces.	Area. sq. m.	Pop.	Acres cultivated.	Revenue.
Aracan,	23,529	447,957	.....	£174,840
Pegu,	36,454	1,533,505	.....	885,500
Tenasserim,	38,898	482,022	.....	168,210
Total,	98,881	2,463,484	1,920,000	£1,228,550

The imports of the same year, including treasure, amounted to £1,067,391, and the exports to £1,779,412, the vast majority of the trade being with the United Kingdom. The exports were chiefly of rice and timber. The principal ports are Moulmein, Rangoon, and Akyab.

BIRMAN EMPIRE, an Asiatic state, which, previous to the war with the East India Company in 1826, is said to have extended from 9° to 26° N. lat., and from 92° to 104° E. lon., its length being thus 1050 geographical miles, and its breadth 600. Hamilton supposed that the Birman Dominion, before the above year, might contain 194,000 English square miles. But in 1826 the Tenasserim provinces of Amherst or Moulmein, Tavoy, and Mergui, along with Aracan, and in 1853 Pegu and the province of Martaban, were wrested from this extensive native government by the East India Company, and its southern limits have receded from 9° to 19° 40′ N. lat. The Birman Empire is bounded on the N. by Assam and Thibet; on the E. by China and Laos; on the S. by Siam and the British province of Pegu; and on the W. by

Munneepore, and a range of mountains separating it from Tipperah, Chittagong, and Aracan.

Before the rains commence, the heat in the valleys of this, in most respects, healthy country, is excessive. Though Birmah is in general fertile, it contains several vast deserts. In the northern part it is mountainous, and abounds in gold, silver, precious stones, and marble; also in iron, lead, tin, antimony, arsenic, sulphur, and petroleum, which issues from the earth in abundance. In the southern districts, owing to the numerous rivers, the soil is marshy and extremely productive. Here grow rice, sugar-cane, fine tobacco, cotton, indigo, and all the tropical fruits. Land is cheap. Timber for ship-building, especially teak or Indian oak, which grows most luxuriantly in a wet soil on the banks of rivers, is abundant. The price of labour is high. All but the lowest lands produce grain, or serve for pasture. Of manufactured goods, Birmah exports cotton and silk stuffs, glass, powder, saltpetre, porcelain, and marble images of Buddha, to which the workmen in stone give an exquisite smoothness. The East India Company used to build vessels even of 1000 tons burden in the Birman docks, and the shipwrights there (giants in comparison with the puny Hindoos) found constant employment. The trade of the country is very lively, especially with China, by means of the river Irrawaddy, which extends 1240 miles into the interior, and has populous cities all along its banks. From Bhamo goods are conveyed through the interior to China, to which the Birmans send many commodities from the Eastern Archipelago of Asia. Since the conquest of Pegu by the British the Birmans possess no sea-port, but the trade of Rangoon, Bassein, &c., has greatly increased since they changed masters. Instead of coin, silver and lead in bars are used, and their purity is strictly tested in trade. The forging and stamping of these bars forms a particular branch of business.

The pop. of Birmah has been estimated at 8,000,000, but probably does not exceed 4,000,000 souls. The inhabitants are said to be divided into eighteen tribes, and belong to the common Indo-Chinese stock. It is far from being a homogeneous mass, distinguished by the same manners, language, and religion.

The Birman nobles are distinguished from the lower classes by their dress, houses, and furniture, and are divided into several ranks. The prince is absolute, but custom obliges him to ask the opinion of the nobility in important state matters; he is not bound, however, by their counsel. The Birmans are all fond of painting both their faces and hands. They slaughter no tame animals, and live simply, for the most part on vegetables. No Birman can have more than one wife; but he may have as many mistresses as he will. The latter live in the same house with the wife, and are her servants. A foreigner and an adult male Birman may at any time leave the empire, but females and children are not allowed this privilege. Females cannot appear before a court of justice. The chief amusement of the Birmans is their theatre, where declamation, dancing, and music alternate: the higher classes are fond of dramatic spectacles. The new year is celebrated with all sorts of purification. At this time young women appear in public with water and sprinkle every one they please. It is considered improper, however, to sprinkle females first, or those in a state of pregnancy at all. Among the Birmans the distinguished dead are burned; the poor are interred; the richest are embalmed, commonly in the ancient simple mode, namely in honey. Every Birman learns arithmetic, reading, and writing. The common people write on palm leaves with an iron style; the rich have libraries, with books the leaves of which are thin pieces of ivory, with gilt edges. The Birmans in general are fond of gilding everything. Their materia medica is confined to herbs, spices, and mercury: with vaccination they have long been acquainted. Missionaries and all religions are tolerated; but the Christian faith has not yet made much progress in the country. The literary Birmans translate from the English all important works of science, particularly on astronomy and law. The Birmans are skilful weavers, smiths, sculptors, workers in gold and silver, joiners, &c. Of this the citizens of London have had ocular evidence in the great state carriage, devoted to the service of the gods, 19 feet high, 14 long, and 7 wide, which was taken by the British troops in the war of 1825. The buildings among the Birmans are very slight, as the government requires them to be chiefly of wood or bamboo, and prohibits the use of stone or brick except for pagodas, &c.

Among the common people the principal part of the male dress, which covers the loins and reaches half-way down the leg, consists of a double piece of cloth about 10 cubits long, and is loosely wrapped about the body. Over this a frock is worn, with sleeves open in front, and reaching below the knees: this frock consists in summer of white cotton, broadcloth, or velvet, and in winter is quilted. The head is covered with a small square handkerchief, commonly of British book-muslin, which is worn like a turban. The lower classes of women wear only a single garment, called a *thabi*, resembling a sheet. This is wrapped round the body, and crossing the breasts, is fastened under the arms. It descends almost to the ankles, but is not closed by a seam before. The nobleman's dress consists of a long robe of flowered velvet or satin, which reaches the ankles, and of which the sleeves and collar are open. A mantle or scarf thrown over this hangs from the shoulders. On the head is worn a high velvet or silk cap, which by being plain, or embroidered, indicates the rank of the wearer. The men wear ear-rings, which in those of high rank are generally of a large size, and weigh down the ears almost to the shoulders. The rank of women is distinguished by the fillets and ornaments by which the hair is bound in a bunch on the top of the head. Those of the higher classes generally wear a shift which reaches only to the pit of the stomach, where it is drawn tight and fastened by strings. This is covered by a loose jacket, with tight sleeves. A piece of silk or cloth encircles the waist and descends to the feet. When they go abroad a silk sash crosses the bosom, while the ends are thrown over the shoulders. When a woman wishes to be particularly fine, she stains her nails and the palms of her hands of a red colour, she strews on her bosom the powder of sandal-wood; with the same powder she sometimes rubs her face; and she tinges her teeth and the edges of her eyelids with black. The last custom is sometimes adopted by the men. Both sexes wear the hair long; the men tying it in a knot on the crown of the head, the women on the back. Sandals are often worn, but neither boots, shoes, nor stockings; every man, woman, and child, however, carries an umbrella. Tattooing, chiefly on the legs and lower parts of the body, prevails among the male part of the population; and the chewing of betel and smoking of tobacco are universal.

The form of government is an absolute monarchy, the king having unlimited power over life and property. The seat of government, after oscillating between Ava and Amarapoora, is understood now to be fixed in Mandalay, a new town, founded in 1857, and situated in a dusty plain 2 or 3 miles from the banks of the Irrawaddy, and about 28 miles S.W. from Amarapoora. The revenue is a tenth part of

the productions of the soil and of all imported goods. The treasury is rich, and the sovereign regards an active trade among his subjects as the surest basis of national revenue: he calls his great income from customs the *tribute of strangers*. In Birmah there are no hereditary offices. Its civil and criminal code is very judicious; general principles are first laid down and then applied to distinct cases. Robbery is punished with death only when the property stolen is very great or the offence is aggravated by particular circumstances. Capital punishment is commonly inflicted by decapitation, and extends to those who eat opium freely, and to drunkards in general. The magistrates have a great discretionary power to mitigate the punishments of the law, and few penal laws are executed in all their severity. The standing army is small. Levies are made in case of war, by way of conscription; and a specified number of houses is required to furnish a soldier completely equipped, or pay a considerable fine. For the crime of insubordination the conscribed are either punished personally or their families are made to suffer, however innocent they may be. The principal part of the militia are employed in the war-boats of the crown, which draw about 3 feet of water, and are provided with ordnance.

The religion of the country is that of Buddha, whom the people call *Gautama*. It enjoins no bloody sacrifices, and is extremely tolerant. The Birmans have no secular clergy, but only a kind of monks dwelling in convents. All the clergy practise celibacy, and eat but once a day. Every carnal indulgence is punished by a disgraceful and public removal from office. The clergy are literary men, and highly esteemed for their piety and knowledge. They are permitted, however, to gild and paint. Formerly there were priestesses, but this order has been abolished, because it was found injurious to the increase of population.

The Birman Empire is of little note in ancient or general history. In Dalrymple's Oriental Repertory the Birmans are called *Boraghmans*. In the Birman alphabet published at Rome in 1776, the name is written *Bomans*. They call themselves *Mranma*. Their native country is Ava proper, and they were at one time subject to the King of Pegu; but in the sixteenth century this numerous and warlike people revolutionized the country by taking possession of Ava, and then of Martaban. The Birmans continued masters of this country till 1740, when a civil war broke out in Pegu. In 1750 and 1751 the Peguans, with the aid of arms imported by Europeans, and the active services of some Dutch and Portuguese, beat their rivals, and in 1752 Ava, the capital, surrendered to them at discretion. The conquest had scarcely appeared complete and settled when a Birman called Alompra, a man of obscure birth, having collected around him 100 picked men, defeated the Peguan detachments in small skirmishes, and in the autumn of 1753 obtained possession of Ava. Having sustained some indignities from the Siamese, he invaded Siam; but, during the siege of the metropolis of that kingdom, his career of conquest was suddenly terminated in 1760 by a fatal disease in the fiftieth year of his age, and ninth of his reign. Alompra laboured to make his subjects happy, and ruled well and wisely. Namdogee, his eldest son and successor, who died in 1764, inheriting his father's spirit, adopted from other nations whatever was of general utility to his own, and was anxious to do away with abuses. Both father and son attended particularly to the administration of the East India Company. Shambuan, the emperor's brother, became regent as guardian for his nephew Momien; but he usurped the throne himself and conquered Siam. In 1771, however, this province recovered its independence, while the principal part of the Birman forces were engaged in a war with China. In this war they were victorious, and compelled the Chinese whom they took prisoners to intermarry with the Birman females, and to remain in their territory. Fortune continued to attend this prince, and in 1776 he left his empire, much enlarged, to his son Chenguza. This prince lived in the unrestrained indulgence of every appetite till, in 1782, he was dethroned and put to death. In consequence of the revolution, Shembuan Menderagan, the fourth son of Alompra, ascended the throne. He ordered his nephew Momien, who was a state prisoner, to be drowned, and in 1783 subdued the kingdom of Aracan. He then engaged in a war with Siam, which continued till 1793, and finally compelled it to submission on certain conditions. About this period some highway robbers fled from the Birman Empire, and took refuge in the territory of the East India Company. Shembuan demanded that they should be delivered up. His demands were not immediately complied with, and he marched with a strong force into the offending country. At the same time he carried on a friendly negotiation with the government in Calcutta, which resulted in the surrender of the criminals, and the conclusion of a treaty of amity and commerce between the two governments, which agreed to afford each other mutual aid in case of an invasion from China. It was negotiated by Captain Symes. Shembuan was succeeded in 1819 by his grandson.

The last victory of the Birmans was in 1822 over the northern mountainous province of Assam, lying S. of the Brahmapootra. The party driven from Assam, together with the Birman rebels, fled to the British territories, whence they intended to invade Birmah. The British government forthwith disarmed the insurgents, but refused to deliver them up or to drive them from the Island of Shapuri, which they had occupied. The court at Ummerapoora, therefore, attempted to set the Mahrattas and all Hindostan in arms against the English. At length the Monarch with the Golden Feet (one of the titles of the sovereign of Birmah) demanded of the government at Calcutta the cession of Northern Bengal as being a part of Ava, and in January, 1824, the Birman forces marched into Cachar, which had deposed its rulers and put itself under British protection. Lord Amherst, as governor-general of the British East Indies, now declared war against Birmah, and General Archibald Campbell prosecuted it so successfully that, after the victory at Prome (Dec. 1–3, 1825), he obliged the monarch to conclude a very unequal peace at Palanagh, Dec. 31, 1825. As the treaty was not ratified on the part of Boa, the Birman emperor, by the time specified (Jan. 18, 1826), Campbell renewed the war on the 19th, and stormed the fortress of Munnun. Feb. 24, the peace was ratified, and the war concluded. The King of the White Elephants ceded to the Company the provinces of Aracan, Mergui, Tavoy, and Yei, and paid them a sum amounting to £1,250,000. Assam was made once more independent, and rajahs were appointed by the Company to govern the northern provinces of Muneepore, Assam, Cachar, and Yeahung. The important city of Rangoon was declared a free port. A war which the Birmese were again infatuated enough to provoke ended in the annexation in 1853 of the whole province of Pegu to the British Empire.

BIRMINGHAM (anciently *Bremenium*), one of the greatest manufacturing towns of England, situated in the N.W. extremity of county Warwick, 112¼ miles by railway N.W. from London, stands nearly in the centre of England, on slightly elevated ground,

having an ascent on all sides but the N.W. It is somewhat circular in form, and about 5½ to 6 miles in circumference. The lower part of the town, consisting chiefly of old houses, is crowded with workshops and warehouses, and inhabited principally by manufacturers; but the upper part contains a number of new, broad, and regular streets. The most remarkable public buildings are the town-hall and free grammar-school, the latter founded and chartered by Edward VI. The town-hall, erected for municipal purposes, public meetings, and musical performances, is the great ornament of the town. It is a rectangular building, after the model of the temple of Jupiter Stator at Rome. It rests on a rustic basement of 20 feet in height, pierced with doors and windows, and is surrounded by a series of Corinthian columns supporting entablatures above. The large saloon or hall is 145 feet long, 65 wide, and 65 high. It can accommodate above 4000 persons sitting; and contains a large orchestra, capable of holding 400 performers, with a lofty, wide, and deep recess for the organ, one of the largest and finest in the world. The free grammar-school, a beautiful structure, erected in 1834, stands nearly in the centre of the town. Among the other public buildings of note are the Queen's College (late the royal school of medicine and surgery), founded in 1828, containing most valuable and extensive museums of human and comparative anatomy; the Queen's Hospital, lying-in-hospital, deaf and dumb institution, blue-coat school, blind asylum, Bingley Exhibition Hall, Hebrew school, odd-fellows' hall, bankruptcy court, two theatres, the post-office, the dispensary, and the market-hall, wash-houses, and baths; and to these may be added the proof-house, the London and North-western Railway station, the general hospital, the cavalry and infantry barracks, the Birmingham library, the exchange buildings, county court, public dining-halls, two clubs, public gallery of art, Midland Institute, masonic hall, corn-exchange, and statues of the late Prince Consort, James Watt, Sir Robert Peel, and others, also a colossal bronze statue of Lord Nelson, in the centre of the open area called the Bull Ring. Among the numerous churches and places of worship are some handsome and elegant structures, the most remarkable being the Roman Catholic cathedral of St. Chad, erected at an expense of £60,000. Amongst the charitable institutions, the most important are the general hospital and the Queen's Hospital, founded in 1840, and numerous alms-houses for the aged and infirm poor. Besides the free grammar-school and Queen's College, already alluded to, the principal educational establishments of Birmingham are—the blue-coat, with accommodation for 200 boys and 100 girls; the Protestant Dissenters' Charity School, established in 1762; St. Philip's Industrial Free School, originally established in 1824, though the present building was erected in 1846; and Springhill College, for the education of clergymen of the Independent persuasion.

The origin and progress of the prosperity of Birmingham is wholly attributable to the excellence and extent of its hardware manufactures. Its geographically central situation on the border of a great coal and iron district, combined with the command of a wide and ready transit, both by canal and railway—of which means of transit it may be considered the great centre for the kingdom—have contributed to render it the emporium from which a large surrounding district is supplied, and likewise one of the greatest manufacturing towns in the particular line above alluded to in the world; approached only, perhaps, by Sheffield. Nowhere else can we find such extraordinary developments of human skill and ingenuity, nor such perfection in the arts in which they are employed. The vast variety of trades render it a desirable place for the talented and skilled artisan; and this variety is such, that it has seldom happened that Birmingham has been distressed, like many towns, from utter lack of employment. Of the early history of Birmingham, as a manufacturing town, little further is known beyond the general fact that it has enjoyed a reputation for its iron and steel manufactures for several centuries; although its greatest and most rapid progress has taken place within the last forty years. One of the most important manufactures is that of fire-arms. During the war against Napoleon I., 5,000,000 were furnished on account of government and of the private trade; those for the former being supplied at the rate of 15,000 muskets weekly. The manufacture of swords is also one of the staple trades. At Soho, in the vicinity of the town, was formerly one of the largest steam-engine manufactories in the world, belonging to Boulton, partner of the celebrated James Watt; but the steam-engine department is now carried on exclusively at Smethwick, a short distance to the W. of Soho, where are extensive works belonging to the same company. Goods of various descriptions, however, are still made at Soho, such as vases, candelabras, and other articles in bronze or *ormulu*, with large quantities of plate. Here, also, the copper coinage of the kingdom used to be executed. Cast-iron articles of all kinds, and of the most beautiful patterns and workmanship, are manufactured at Birmingham to a great extent, superseding those made of more expensive metals. In former years iron-founding was limited to large and heavy articles, but is now extended, with the most entire success, to the lightest and most graceful, in the finishing of which bronze is now very generally employed. The quantity of solid gold and silver plate manufactured is large, and the consumption of silver in plating is very considerable. The beautiful invention of electro-plating, first discovered in this town, tends very greatly to the increase of the consumption of silver and also of gold. The vast establishment of Smith, Elkington, & Co., New Hall Street, is an object of great attraction. Japanning, in all its forms and varieties, is carried on here to a large extent; and though of comparatively recent introduction, has attained to a great degree of perfection, especially in the pictorial department; the trays and waiters manufactured in Birmingham, particularly those of *papier maché*, often displaying taste and talent of the highest order. Glass manufacturing, and glass staining or painting, forms another important branch of manufacture. The making of steel pens is another important branch of the trade of Birmingham. One manufacturer of this apparently trivial article employs 400 individuals, and consumes upwards of 85 tons of fine sheet-steel annually, each ton making 10,000 gross of pens. The price of this article has fallen from 12*s.* per dozen to 1*s.* per gross, and still lower for an inferior article. The whole quantity of steel pens now manufactured is estimated at 900,000,000 annually, consuming above 500 tons of steel. Large quantities of these are exported. Pins are also manufactured here to a great extent; and such is the extraordinary productive powers of the machinery employed, and of the system of minute subdivision of labour, that 12,000 pins can be cut and pointed in an hour, and 50,000 heads rounded off in the same space of time. Fancy seals, brooches, clasps, and other trinkets, composed of what is called Birmingham gold, and polished steel, are made in immense quantities, of the most beautiful workmanship, and at prices which excite astonishment. The above sketch gives only a selection of a few of the leading articles manufactured

at this great seat of human industry and ingenuity. The simple enumeration of all, without any statistical detail, would occupy a far greater space than could be afforded in a work of this nature. The machinery employed in the manufacture of nails, screws, button shanks, and in rolling out thick bars or ingots of metal into long thin sheets, are amongst the most wonderful inventions of the mechanical genius of this extraordinary place; all of these combining prodigious power with the most delicate and beautiful precision of movement. Though a good many large capitalists are engaged in the manufactures of Birmingham, large numbers average from £500 to £1000. These persons give out their work to the workmen they employ, who are generally paid by the piece and work at home. The employer has thus no expensive establishment to maintain, and no wages to pay but when he has orders to execute. The workman, again, when the work put into his hands requires the aid of machinery, may hire, for any given time, one or more rooms, together with a certain quantity of steam-power, in any one of a number of buildings appropriated to such purposes, which are furnished with steam-engine, working-shafts, lathes, benches, &c.

By the reform act of 1832 Birmingham was constituted a borough, sending two members to Parliament, while the act of 1867 gave it a third. The aldermen are in the commission of the peace, and hold regular borough courts. The county magistrates sit in petty session for the division twice a week, and the borough magistrates daily. The county court has also been established in Birmingham. At Winson Green, 2½ miles from the town, is a borough jail, and near it a lunatic asylum. The borough comprises the parishes of Birmingham and Edgbaston, and the townships of Bordesley, Deritend, Duddeston, and Nechells.

Birmingham was known to the Romans under the name of *Bremenium*, and is mentioned in Doomsday Book under the name of *Bermengeham*. It is said to have been celebrated for the manufacture of arms previous to the Roman invasion. Of its early history, however, very little is known. It was the centre of the Saxon kingdom of Mercia; and at the time of the Conquest was a place of some consideration. Birmingham was distinguished in the cause of the Parliament, and was the scene of some conflicts, in the last of which, in 1643, it suffered considerably, having been taken, partially burned, and a heavy fine inflicted on the inhabitants by Prince Rupert. It suffered to a fearful extent from the plague in 1665. Its first considerable increase in size and pop. took place in the reign of Charles II. Toward the middle of the last century it began to assume an important appearance, and has since continued rapidly to increase. The American and French wars during the latter part of the last century and the early part of this, were the great causes of the prosperity and increase of the place, by the great demand which they caused for muskets. In July, 1791, Birmingham was the scene of a series of disgraceful riots; property was destroyed to the amount of £60,000. In 1839 riots again took place, when several private buildings in the neighbourhood were set on fire, and various other excesses committed. During the excitement of 1848 not one man was taken into custody for any political offence—a circumstance indicative of great moral improvement. The general healthiness of Birmingham is deserving of notice, for which it is probably indebted to the larger quantity of open space which it possesses, when compared with such towns as Manchester and Liverpool; the general excellence of its drainage, greatly facilitated by the substratum of sand and gravel on which it is built; and the circumstance that there is scarcely an underground dwelling, or what is called a cellar, within its precincts.

In 1801 the pop. of Birmingham and the suburbs was 73,670; in 1861, 296,076; and in 1871, 343,696.

BIRON, Charles de Gontaut, Duke of, son of Marshal Armand de Gontaut, Baron Biron, born about 1562. Educated as a Calvinist, he had twice changed his religion before he reached the sixteenth year of his age. In his fourteenth year he was made colonel of the Swiss regiment, and served Henry IV. with much zeal and courage. By the king's favour he was, in 1592, raised to the rank of Admiral of France. Though distinguished at court as well as in the field, always feared and praised, he was violent, obstinate, and presumptuous. At the retaking of Amiens, in 1598, he served under Henry IV., and in the same year was made a peer and duke. He thought himself, however, not sufficiently rewarded. The Spanish party, which, after the peace of Vervins, could injure Henry only by secret intrigues, took advantage of the duke's discontent. Henry appointed him his ambassador at the court of Brussels, to receive the oath of the archduke to the peace of Vervins. The Spanish court seized this opportunity to dazzle him with festivals, spectacles, and honours; the female arts of seduction were put in practice, and he promised to join the Catholics whenever they should rise again. In 1599 he concluded an agreement with the Duke of Savoy and the Count of Fuentes, by which he pledged himself to take up arms against his benefactor. Meanwhile, war being declared against the Duke of Savoy (1600), Biron saw himself reduced to the necessity of attacking him. For fear that his understanding with the duke should become visible, he possessed himself of almost all the towns in the duchy, which was the easier, because Emanuel had expected some forbearance on his part. Fuentes and the duke ventured to propose to Biron that he should deliver the person of the king into their hands, but he refused. Their suggestions, however, were not without effect upon him, and while engaged in the siege of the fort St. Catherine's in the vicinity of Genoa, having reason to believe that the king would come to inspect the trenches, he sent word to the governor to dispose harquebusiers, so as to fire on him at a certain signal. At the decisive moment, however, he prevented the king from going to the fatal spot. In 1601 peace was made with Savoy. So many negotiations had not, however, escaped the eye of the king, nor could he remain ignorant of their object. He therefore interrogated the marshal as to his designs, with promises of pardon. Biron made a partial confession, and continued his intrigues as before. Notwithstanding this, Henry sent him in the same year to Queen Elizabeth of England to inform her of his marriage with Maria de' Medici. In the meantime, Biron's confidant, Lafin, having become suspected by the Count of Fuentes, and beginning to fear for himself, discovered the whole plot. A frank confession and repentance would have saved Biron, since Henry was inclined to forgive him. He, however, persevered in his denial, rejected the offers of pardon, and was therefore, at the urgent entreaties of the queen, at last surrendered to the rigour of the laws. He was tried before the Parliament, and beheaded, July 31, 1602.

BIRON, Ernest John. See Biren.

BIRR. See Parsonstown.

BIRTH, or Labour, in physiology, is the act by which a female of the class Mammalia brings one of her own species into the world. When the fœtus has remained its due time in the womb, and is in a condition to carry on a separate existence, it is ex-

truded from its place of confinement, in order to live the life which belongs to its species, independently of the mother. The womb having reached its maximum of growth with the increasing size of the fœtus, its peculiar irritability excites in it the power of contraction; it thereby narrows the space within, and pushes out the mature fœtus. The period of gestation is very different in different animals, but in each particular species it is fixed with much precision. In the womb the corporeal frame of man commences existence as an embryo; after further development, appears as a fœtus; then as an immature, and finally a mature, child. With its growth and increasing size, the membranes which envelop it enlarge, the womb also expanding to give room for it. At the end of the thirty-ninth or the beginning of the fortieth week, the child has reached its perfect state, and is capable of living separate from the mother; hence follows in course its separation from her, that is, the birth.

Contractions of the womb gradually come on, which are called, from the painful sensations accompanying them, *labour-pains*. These are of two kinds: first, the preliminary pangs, which begin the labour, do not last long, are not violent, and produce the feeling of a disagreeable straining or pressure. When the pregnant female is attacked by these, she is often unable to move from her place till the pang is over, after which she is often free from pain for some hours. Then follow the true labour-pains; these always last longer, return sooner, and are more violent. The contractions of the womb take place in the same order as the enlargement had previously done, the upper part of it first contracting, while the mouth of the womb enlarges, and grows thin, and the vagina becomes loose and distensible. By this means the fœtus, as the space within the womb is gradually narrowed, descends with a turning motion towards the opening; the fluid contained in the membranes enveloping the fœtus, as the part making the greatest resistance, is forced out, and forms a bladder, which contributes much to the gradual enlargement of the opening of the womb. It is therefore injurious to delivery, if hasty or ignorant midwives break the membranes too soon. By repeated and violent throes the membranes at length burst, and discharge their contents, and some time after the head of the child appears. As the skull-bones have not yet acquired their perfect form and substance, but are attached at the crown of the head only by a strong membrane, and may be brought nearer together, the head, by the pressure which it undergoes, may be somewhat diminished in size, and squeezed into a more oblong form, so as to pass through the opening of the matrix and the pelvis in which it is contained, and, finally, through the external parts of generation; and when this is done, the rest of the body soon follows.

The act of birth or delivery is accordingly, in general, not an unnatural, dangerous, and diseased state of the system, as many timid women imagine. It is a natural process of development, which is no more a disease than the cutting of the teeth, or the coming on of puberty, although, like them, it may give rise to important changes in the body, and to various diseases. It is true that the process of childbirth requires a violent exertion of nature, but this is facilitated by many preparatives and helps adapted to the purpose. If the birth succeeds in the way described, it is called a *natural birth*. For this it is requisite that the pelvis should be properly formed, and that the opening should permit a free passage to the perfect fœtus; that the growth and size of the fœtus should be proportioned to the pelvis, especially that the head should have the size designed by nature, proportioned to the diameter of the pelvis; also, that there should be a proper situation of the womb, in regard to the axis of the pelvis, and a proper position of the fœtus, namely, the head down, the back of the head in front, and towards the opening of the womb, so as to appear first at birth; and, finally, that the external parts of generation should be in a natural state.

An easy birth takes place without any excessive strainings, and in due season. A difficult birth proceeds naturally, but is joined with great efforts and pangs, and occupies a long time—over six or eight hours. The cause of it is sometimes the stiffness of the fibres of the mother, her advanced years, the disproportionate size of the child's head, and various other causes. Nature, however, finishes even these births; and women in labour ought not to be immediately dejected and impatient, on account of these difficulties. An *unnatural* (or properly an *irregular*) birth is one in which one or more of the above-mentioned requisites to a natural birth are wanting. An *artificial* birth is that which is accomplished by the help of art, with instruments or the hands of the attendant. *Premature* birth is one which happens some weeks before the usual time, namely, after the seventh, and before the end of the ninth month. Though nature has assigned the period of forty weeks for the full maturing of the fœtus, it sometimes attains, some weeks before this period has elapsed, such a growth that it may be preserved alive, in some cases, after its separation from the mother. That it has not reached its mature state is determined by various indications. Such a child, for instance, does not cry like full-grown infants, but only utters a faint sound, sleeps constantly, and must be kept constantly warm, otherwise its hands and feet immediately become chilled. Besides this, in a premature child, more or less, according as it is more or less premature, the skin over the whole body is red, often indeed blue, covered with a fine, long, woolly hair, especially on the sides of the face, and on the back; the fontanel of the head is large, the skull-bones easily moved; the face looks old and wrinkled; the eyes are generally closed; the nails on the fingers and toes short, tender, and soft, hardly a line in length; the weight of such a child is under six, often under five pounds. The birth is called *untimely* when the fœtus is separated from the womb before the seventh month. Such children can be rarely kept alive; there are instances, however, of five months' children living. A curious remark is found in good writers, that a seven months' child is more likely to live than one born a month later.

Late birth is a birth after the usual period of forty weeks. As this reckoning of the time of pregnancy to birth is founded for the most part solely on the evidence of the mother, there is much room for mistake or deception. The question is one of much interest in medical jurisprudence, as the inquiry often arises whether a child born more than forty weeks after the death of the reputed father is to be considered legitimate or not. The importance of the question, and the uncertainty of the proof, have occasioned a great variety of opinions among medical writers. Most of them doubt the truth of the mother's assertions about such a delayed birth, and give, as their reason, that nature confines herself to the fixed period of pregnancy; that grief, sickness, &c., cannot hinder the growth of the fœtus, &c. Others maintain, on the contrary, that nature binds herself to no fixed rules; that various causes may delay the growth of the child, &c.

Abortion and miscarriage take place when a fœtus is brought forth so immature that it cannot live.

They happen from the beginning of pregnancy to the seventh month, but most frequently in the third month. The occasions, especially in those of a susceptible or sanguine temperament, are violent shocks of body or mind by blows, falling, dancing, cramp, passion, &c.

BISCAY (Spanish *Vizcaya*), also called BILBAO, a province of Spain, forming one of the three Basque provinces (Provincias Vascongadas), the other two being Alava and Guipuzcoa. It lies near the N.E. corner of Spain, between the Bay of Biscay and the provinces of Santander, Burgos, Alava, and Guipuzcoa. The area is 850 square miles; the pop. 183,098. The surface is generally mountainous; the principal river is the Nervion or Ibaizabal. In point of soil and natural productions Biscay is one of the least favoured provinces of Spain; but the industry of the inhabitants has been successfully exerted in converting naturally barren tracts into fruitful fields and verdant pastures. The chief crops are maize and barley. Many fine fruits, especially nectarines, are raised; walnuts and chestnuts everywhere abound, and form a considerable export to England and Germany. The cattle are of a small and inferior breed; and the rearing of sheep for wool is rendered difficult by the brushwood which covers great part of the mountain districts, and tears and destroys the fleece. Fish abound along the coast, and give occupation to a great number of fishing-boats. The principal species taken are bream, tunny, cod, and anchovies. The most important mineral is iron, which is found of excellent quality throughout the province, and is extensively worked. Lead, copper, and zinc also occur. The inhabitants of Biscay, who are called Basques (see BASQUES), are brave, active, and industrious. They inhabit not only Biscay and the other two Basque provinces strictly so called, but also the province of Navarre, and are estimated to amount in number to 650,000. The capital of Biscay is Bilbao; of Guipuzcoa, St. Sebastian; of Alava, Vittoria; of Navarre, Pampeluna. The general character of these provinces resembles that of the province of Biscay. The Basque country long formed a kind of state distinct from the rest of Spain, governed according to its own ancient laws and usages.

BISCAY, BAY OF, that part of the Atlantic which lies N. of the province of Biscay, between the projecting coasts of France and Spain, extending from Ushant to Cape Finisterre.

BISCAY, NEW. See DURANGO.

BISCEGLIE, a sea-port town, kingdom of Italy, province of Bari, 13 miles E.S.E of Barletta, on a rock, W. shore of the Adriatic, surrounded by walls, and in general badly built. It has a cathedral, two collegiate and several other churches, convents of both sexes, a seminary, hospital, and a *mont-de-piété*. The port admits vessels of small burden only. The town being almost destitute of water, rain is collected in large cisterns cut in the solid rock. The neighbourhood produces good wine. Important fairs are held here twice a year. Pop. in 1871, 21,371.

BISCHOFSWERDER, JOHANN RUDOLPH VON, a Prussian general and minister, born in Saxony about 1737, entered the University of Halle in 1756, was admitted into the Prussian service in 1760, and appointed major in 1779. Under Frederick William II. he exercised an unlimited influence at the court of Berlin. The attachment which he had shown Frederick William while yet crown-prince procured him the lasting affection of this short-sighted and prodigal monarch. As plenipotentiary he took a great part in the congress at Sistova. He afterwards effected the interview with Lord Elgin at Pillnitz. After the king's death he was dismissed, and died at his country-seat in the neighbourhood of Berlin, 1803. His views as a statesman and a man were very limited. His propensity to mysticism had consequences in the highest degree injurious. He belonged to the society of the Illuminati.

BISCHWEILER, a town in Germany, in the imperial territory of Elsass-Lothringen (Alsace-Lorraine), 12 miles N. of Strasburg, on the right bank of the Moder. It was formerly an episcopal town, and defended by a castle erected in the fifteenth century, but dismantled in 1706. It has manufactures of cloth for the army, ticks, linen, woollen gloves, knitted articles, oil, and pottery; besides bleachfields, spinning-mills, breweries, tanneries, madder-mills, and iron mines. Its trade is in wine, hops, hemp, tobacco, madder, coal, cattle, &c. Pop. in 1866, 9711.

BISCUIT, compounded of two words meaning *twice baked*, is applied to a kind of hard, dry bread which keeps long, and is hence the common bread used at sea. Biscuits are either fermented or unfermented. The kinds of biscuits in ordinary use are generally fermented, while the unfermented biscuit is that which is used in the navy, and hence called sea-biscuit. Its good quality chiefly depends on the thorough kneading of the dough, and the subsequent division of it into portions of equal size and thickness. When properly prepared it will continue perfectly sound for eighteen months to two years, and in regard to nutritive properties it has been ascertained that eighteen ounces of biscuit are exactly equal to twenty-four ounces of fresh-baked ordinary bread. Owing to the immense quantities of biscuit required for the navy, manual labour in the preparation of it has been supplanted by machinery. First the meal, consisting of a mixture of fine flour and middlings, is conveyed into a cylinder 4½ feet long and 3 feet 2 inches in diameter, and the exact quantity of water ascertained to be necessary, and regulated by a gauge, is let in from a cistern. A shaft armed with knives, and placed in the centre of the cylinder, is made to revolve horizontally through the meal and water, and in two minutes the mixture is converted into 5 cwts. of well-mixed dough. The dough, removed by a simple but ingenious process, is placed under two breaking rollers of 1500 lbs. each, which by passing over it backwards and forwards perform the process of kneading, and in the course of five minutes give to the dough a solid, perfect, and equal consistency. The dough is now cut into pieces 18 inches square, placed on boards 6 feet long by 3 feet wide, and conveyed to a second set of rollers, which pressing upon each square give it the requisite thickness by spreading it evenly over the whole surface of its board. In this state the board is placed under the stamping plate, which instantly cuts and stamps, or as it is called *docks*, the dough into forty-two hexagonal biscuits, which are forthwith conveyed on carriages to the oven. The hexagonal form being the only one which will cut the whole dough without leaving interstices is justly preferred to any other; and the stamping is not only to separate and perforate the biscuits, but to impress each with the broad arrow and the number of the oven in which it is to be baked. Each oven, made of wrought iron, has an area of about 160 square feet, and receives at one time 112 lbs. of raw biscuit, afterwards reduced by baking to about 100 lbs. The advantages gained by the machinery are both in the unlimited power of supply and the great saving of expense. Bakehouses have been erected at Deptford, Gosport, and Plymouth; and by working only eight hours a day could annually turn out 7354 tons of biscuit. Previously, though double gangs of workmen were constantly employed, the demand in time of war could not be met by the government establishments, and required the employment of con-

tractors often at an extravagant price. The 7354 tons would formerly have cost in labour and utensils 19*d.* per cwt., but would now cost only 5¾*d.* per cwt. In other words, the whole cost without machinery is £11,643, and with it only £3217, showing a net saving in the latter of £8426.

BISHOP (a word derived from the Greek *episcopos*, that is, overseer, through the Saxon *biscop*), in the early Christian church, was the name of every person to whom the care of a Christian congregation was intrusted. Every congregation even in country districts had at least one such overseer. The word was accordingly used in the early history of the church in exactly the same sense as presbyter or elder. This is confirmed not only by the express statements to that effect of the oldest ecclesiastical writers, but also by the New Testament itself. In Acts xx. 17 the writer of the Acts of the Apostles says that Paul sent from Miletus to Ephesus for the 'elders' of the church, and in the 28th verse he addresses these elders as 'overseers' or 'bishops;' and the apostles, in addressing the elders of the church, in some instances speak of themselves as presbyters or fellow-presbyters (1 Pet. v. 1; 2 and 3 John 1). The identity of the original signification of the words 'presbyter' and 'bishop' was acknowledged by the Christian fathers St. Jerome and St. Augustine in the fifth century, and even by Pope Urban II. at the end of the eleventh century, and it is not denied by many Episcopalians even at the present day. By the Council of Trent, however, the doctrine which placed presbyters and bishops originally on a footing of perfect equality in the early church was declared as a heresy, the object of which was to deny to the bishops of the church the priority of rank which they claimed. Those who adhere to the Episcopalian form of church government, and at the same time admit the original identity of presbyters and bishops, differ from the Presbyterians in their theory of the origin of the episcopal authority. The Episcopalians maintain that even before the words had a separate meaning attached to them, the distinction between bishops and subordinate pastors existed in fact, and was a regular ecclesiastical institution, those who held a peculiar authority over others being appointed originally by the apostles. The Presbyterians, on the other hand, believe that the authority that was undoubtedly conceded to certain of the 'bishops' or 'presbyters' when they met to consider the affairs of the church, was not due to any formal appointment, but merely to the mutual agreement of the assembled presbyters, and that this distinction was no more than a mark of respect paid to some member who was venerable by his age or distinguished by his piety. But, whichever of these two theories may be correct, there is no doubt of the fact that at a comparatively early period in the history of the church a position of authority was acquired by the pastors of the Christian communities belonging to certain places, and that these came to be distinguished from the others by the name of bishops. The growth of this authority was favoured by the doctrine which was started about the beginning of the second century with regard to the priestly dignity being a peculiarly divine institution. The more this doctrine was affirmed the higher grew the claims of the bishops. Ignatius of Antioch, who died about 115, had already declared every bishop to be a representative of Christ, and 100 years later the doctrine of the apostolical succession was developed, that is to say, the doctrine of the transmission of the ministerial authority in uninterrupted succession from Christ to the apostles, and through these from one bishop to another. By the foundation of new churches in the larger towns which were affiliated to the original churches, and by the dependence of the presbyters in the country districts upon those having urban charges, the authority of the bishops came to be gradually extended over greater or less dioceses; and at the same time the bishops began to reserve to themselves peculiar privileges. While at first the bishops in all the more important matters were dependent on the approval of the presbyters and congregations, they appear at the Council of Nice in 325 as the sole possessors of the right of voting.

While this then was the position of the bishops in relation to the presbyters, they at first considered themselves as standing on a footing of equality in relation to each other. But as certain of the presbyters in their assemblies had acquired a priority of rank over the others, it gradually came about in the same way that the bishops of the chief cities (Jerusalem, Antioch, Corinth, Alexandria, Constantinople, Rome) obtained a similar precedence among the bishops, and received the title of metropolitan bishops; and so early as the beginning of the fourth century we find the Bishop of Rome claiming to be the head of the church as the true successor of Peter, whom Christ himself had pronounced to be the rock on which he would build his church. Rome, however, was not allowed to assume this rank uncontested. Several of the other metropolitan bishops claimed the rank for themselves, and the conflict went on until Syria, Asia Minor, and Egypt were wrested from Christendom by the Mohammedans, when the only two cities that were left to dispute the priority of rank in the church were Rome and Constantinople. Meantime the Bishop of Rome had assumed the title *Papa* ('father,' 'pope'), in order to avoid even the appearance of equality with the other bishops, and in course of time his claim was recognized throughout Christendom, except in those parts which were under the more immediate supremacy of the Bishop of Constantinople; and the contest between these two great cities of the West and the East was only ended by the separation of the Greek and Roman Churches in 1053. See POPE.

The practice of solemnly investing bishops with their offices dates from the seventh century. Already in the fifth century the popes had begun to send to the newly-elected metropolitan bishops (now called archbishops) the pallium, a kind of official mantle worn by archbishops, as a token of their sanction of the choice. Two centuries later it became the custom to consecrate bishops by investing them with the ring and crosier, the former as a token of marriage with the church, the latter as a symbol of the pastoral office. Since this investiture was what gave validity to the election of the bishops, it became the source of long-continued contests between the popes and the temporal sovereigns in the middle ages. The influential position which the bishops occupied in the state caused the temporal rulers to be desirous of keeping the right of investiture in their own hands, while the popes with equal determination claimed the right for themselves. The contest was most bitter between the popes and the emperors of the Romans, as they were called. It began in the eleventh century, but was not settled till 1122, when it was agreed in the Concordat of Worms between Pope Calixtus II. and the Emperor Henry V. that the election of bishops should take place according to the laws of the church, under the direction of the emperor, and that the spiritual investiture (with ring and crosier) should remain in the hands of the pope, while the bishops were to be invested with the temporal rights of their office by the emperor. This is still the fundamental law of the Roman Catholic Church with regard to investiture. (See INVESTITURE and CONCORDATE.) The election to a bishopric is for the most part in the hands of the dean and chapter of the cathedral of the diocese;

but in some cases it is a right of the territorial sovereign. In any case papal confirmation is requisite before the appointment is complete.

When the system of ecclesiastical rule was matured, the almost absolute authority which they exercised over the clergy of their dioceses; their interference in the secular concerns of governments, to which they soon rendered themselves necessary by their superior information and their elevated rank; the administration of the church revenues; the maintenance of their ecclesiastical prerogatives, and their extensive ecclesiastical as well as criminal jurisdiction, occupied them too much to leave them any time or inclination for the discharge of their duties as teachers and spiritual fathers. They therefore reserved to themselves only the most important functions of their spiritual office, as the ordination of the clergy, the confirmation of youth, and the preparation of the holy oil. In the middle ages they attached to themselves particular vicars called *suffragans*, bishops *in partibus*, or coadjutors, for the performance even of these functions which they had reserved to themselves, and for the inspection of all that concerned the church. Bishops who have preached themselves and attended to the spiritual welfare of their congregations, have been rare since the seventh century. The episcopal office being such as we have described it, the nobility, and even the sons of princes and kings, strove to obtain a dignity which was as honourable as it was profitable, and was not deemed incompatible with festivities and luxurious enjoyment. The splendid establishments which they were able to maintain from the large revenues derived chiefly from rich donations to their churches by pious devotees, gave, to the bishops of Germany particularly, a high degree of dignity. They became princes of the empire, and their influence on public affairs was important. In rank the bishop in Roman Catholic countries follows immediately after the cardinals. Some bishops in the Roman Catholic Church are merely titular, their dioceses not being in countries which acknowledge the Christian faith. The dioceses of such bishops are said to lie *in partibus infidelium*, and they are chiefly those that were wrested from the Christian church by the Mohammedans. Such titular bishoprics are only conferred on ecclesiastics of a high rank.

The Reformation lessened the number of bishops, and although, in some of the Protestant countries of the N. of Europe, the higher clergy have retained the title of *bishop*, yet they have lost the greater part of their former revenues and privileges, although in neither of these particulars have those of England any reason to complain. The English Church has left to its bishops more authority than the rest, and this is one reason why it bears the name of the *episcopal* (see CLERGY and CHURCH OF ENGLAND). In Protestant Germany, bishoprics were abolished by the Reformation, but they have been restored in Prussia.

The bishops of the Greek Catholic Church have less authority than those of the Roman Catholic Church, on account of their dependence in the East on the sultan, and in Russia on the czar. They are usually taken from the monastic orders, and they are appointed by the archbishops.

BISHOP, SIR HENRY ROWLEY, a distinguished musical composer, was born in London in 1780, and trained to his profession under Signor Bianchi, composer to the London Opera House. In 1806 he was appointed composer of the ballet music for the opera. In 1809 his first opera, the Circassian Bride, was produced at Drury Lane with great success; but the following evening the theatre, with the score of Bishop's opera, was consumed by fire. Numerous operas and other musical pieces now followed of his composition, and from this period to 1826 upwards of seventy works were produced by him. Among others may be mentioned the music of Guy Mannering, The Slave, The Miller and his Men, Maid Marian, The Virgin of the Sun, and adaptations of The Barber of Seville and The Marriage of Figaro. From 1810 to 1824 he acted as musical composer and director to Covent Garden Theatre. He also arranged several volumes of the National Melodies, and completed the arrangement of the music for Moore's Irish Melodies, commenced by Sir John Stevenson. In 1826 his Aladdin was produced at Drury Lane, but proved a failure, and its non-success so mortified the author that he abandoned writing for the stage. Shortly after the accession of Queen Victoria he received the honour of knighthood, was elected Reid professor of music in Edinburgh University in 1841, and in 1848 became professor of music in the University of Oxford. Sir Henry Bishop was never noted for prudence in pecuniary matters, and latterly was in rather distressed circumstances. He died 30th April, 1855. The music of Bishop, though not of the highest class, is yet eminently remarkable for its grace, liveliness, and spirit, thoroughly English in its character, and admirably illustrative of the verse to which it is adapted. Many of his compositions, such as the music of The Chough and the Crow, and When the Bloom is on the Rye, have become familiar as household words.

BISHOP-AUCKLAND, a market town, England, in the county and 9 miles S.W. from the town of Durham, on the Stockton and Darlington Railway, is pleasantly situated on an eminence, but not remarkably well built. It is almost wholly supported by the coal traffic. Pop. in 1871, 8736.

BISHOP'S STAFF. See CROSIER.

BISHOP-STORTFORD, a market town, England, county Hertford, 27 miles N.N.E. of London, at a station of the Eastern Counties Railway, is built in the form of a cross, and occupies the acclivities of two hills, on the river Stort. Among the public buildings are a handsome church, with a tower surmounted by a spire of 80 feet in height, several Dissenting chapels, a free grammar and other schools, and an elegant and commodious corn-exchange. The principal trade of the town is malting, which is carried on to a very considerable extent. Pop. 6250.

BISHOP-WEARMOUTH. See SUNDERLAND.

BISIGNANO (ancient *Bisinanium*), a town in the kingdom of Italy, in the province of Calabria Citra, 14 miles N. from Cosenza, the seat of a bishop, and defended by a citadel occupying the summit of the highest of the seven hills that surround it. It contains a cathedral, nineteen churches, several convents, a seminary, two hospitals, and a house of refuge. The cultivation of the silk-worm forms a principal branch of industry. Pop. 3985.

BISMUTH. This substance has been known from the fifteenth century, but its character was long ill-defined, and it was even supposed to be manufactured from zinc. The older chemists called it *tin glass*. It is found native in veins in gneiss, mica-slate, and other primitive rocks, and it also occurs combined with sulphur, oxygen, and arsenic, associated with ores of zinc, lead, silver, cobalt, and nickel. In this country it has been got in Cornwall and in Cumberland; on the Continent in Norway, Sweden, France, Bohemia, and Transylvania; and it is also found in Connecticut, and in Bolivia. The chief supplies of bismuth, however, come from Schneeberg in Saxony. The ore employed is native bismuth, and it is separated from the matrix by breaking it into suitable pieces, introducing these into iron tubes, laid at an angle over a furnace, and applying heat. The metal melts and runs into pots placed at the mouths of the tubes, the

gangue remaining behind. It is afterwards purified by fusion with a small quantity of nitre.

Native bismuth occurs in various forms, all more or less crystalline; its colour is white, with a pinkish tinge; it has metallic lustre, is soft and brittle, and can be easily reduced to powder in a mortar. Commercial bismuth has a crystalline structure, with sometimes an iridescent appearance. Bismuth crystallizes more readily than any of the metals, and very fine specimens may be obtained by melting a quantity in a deep pot, allowing it to cool, and then pouring off the central fluid portion through an opening in the superficial crust. Well-formed crystals are thus obtained, having sometimes a splendid iridescence. The specific gravity of bismuth is 9·83, its fusion point is 476° F., and its crystals belong to the hexagonal system. It mixes readily with other metals, and forms very fusible alloys with them. Newton's fusible metal contains 8 parts bismuth, 5 lead, 3 tin, and fuses at 202° F. Dalton's contains 10½ bismuth, 5 lead, 3 tin, and fuses at 197° F. Some of the alloys of bismuth have the property of expanding when they solidify. Solder, pewter, and other alloys largely used in the arts, contain bismuth.

Bismuth combines with various chemical elements. When dusted, in a fine state of division, into chlorine gas it catches fire and forms a white buttery substance, not unlike butter of antimony. This compound was known to Sir Robert Boyle, who prepared it by distilling metallic bismuth with corrosive sublimate. When metallic bismuth is heated to a high temperature in the air it burns feebly and forms a yellowish white powder, which also occurs native, and is called by mineralogists bismuth-ochre. Another oxide is known which is possessed of slight acid functions. Finely divided bismuth when heated along with sulphur forms an opaque, crystalline, leaden, metallic-looking substance, which also occurs native, and is called *bismuth-glance*. The precipitated sulphide is a dark-brown flocky solid, got by adding sulphuretted hydrogen to a solution of bismuth.

Nitric acid dissolves bismuth readily, and so does aqua regia. If the solution be poured into a large excess of water a white powder is precipitated which is a basic salt. This precipitate is called *pearl-white, magistery of bismuth*, and other names, and is employed as a paint and as a cosmetic. It also serves, with certain precautions, as a test for bismuth. The subnitrate, carbonate, and citrate are the chief compounds employed in medicine.

By its chemical habitudes bismuth belongs to the phosphorus and arsenic group of elements. It is intermediate in properties between the non-metallic elements and the metals. It is a good example of the true metalloid, and this want of the full metallic character was partially observed long ago by Paracelsus, who classed it along with his semi-metals. One of its most striking characters is its diamagnetism.

BISON, the name applied to two species of ox. One of these, the European bison or aurochs (*Bos bison* or *Bison Europæus*), is now nearly extinct, being found only in the forests of Lithuania and the Caucasus (see Ox). The other, or American bison (*Bison Americanus*), is found only in North America, and is remarkable for the great hump or projection over its fore-shoulders, and for the length and fineness of its woolly hair. The hump is oblong, diminishing in height posteriorly, and gives a considerable obliquity to the outline of the back. The hair over the head, neck, and fore-part of the body is long and shaggy, forming a beard beneath the lower jaw, and descending below the knee (wrist) in a tuft. The hair on the summit of the head rises in a dense mass nearly to the tips of the horns, and, directly on the front, is curled and matted strongly.

The numbers of this species still existing are surprisingly great, when we consider the immense destruction annually occurring since European weapons have been employed against them. They were once extensively diffused over what is now the territory of the United States, except that part lying E. of Hudson's River and Lake Champlain, and narrow strips of coast on the Atlantic and Pacific. At the present day their range is very different. They are no longer found except in the remote unsettled regions of the N. and W., being never seen E. of the Mississippi. W. of Lake Winnipeg they are found as far N. as 62°; W. of the Rocky Mountains it is probable they do not extend N. of the Columbia River.

The bison, on his native plains, is of savage and formidable appearance, uniformly inspiring dread when beheld for the first time. His ponderous head, rendered terrific by his thick shaggy hair and streaming beard, is supported upon a massive neck and shoulders, whose apparent strength is more imposing from the augmentation produced by the hump and the long fell of hair covering the anterior parts of the body. Nevertheless, the bison is not known to attack man, unless when wounded and at bay. The difference between the summer and winter dress of the bison consists rather in the length than in other qualities of the hair. In summer, from the shoulders backwards, the surface is covered with a very short fine hair, smooth and soft as velvet. The tail is short, and tufted at the end. Except the long hair on the fore-parts, which are, to a certain extent, of a rust colour or yellowish tinge, the colour is a uniform dun. Varieties of colour are so rare among this species, that the hunters and Indians always regard them as matters of special wonder.

The bison bull is lean, and his flesh disagreeable in the months of August and September. They are much more easily approached and killed than the cows, not being so vigilant, though the cows are preferred both on account of their finer skins and more tender flesh. The cow is much less than the bull, and has not so much of the long hair on the shoulders, &c.; her horns are not so large, nor so much covered by the hair. The sexual season begins towards the end of July, and lasts till near the beginning of September; after this time the cows separate from the bulls in distinct herds. They calve in April; the calves seldom leave the mother until a year old; cows are sometimes seen with calves of three seasons following them.

Bison beef is rather coarser grained than that of the domestic ox, but is considered by hunters and travellers as superior in tenderness and flavour. The hump, which is highly celebrated for its richness and delicacy, is said, when properly cooked, to resemble marrow. The Indian method of preparing this delicacy is the following:—The hump is cut off the shoulders, the bones removed, and a piece of skin is sewed over the denuded part. The hair is then singed off, and the whole is now ready for the oven. This is a hole in the earth, in and over which a fire has been burned, and into this heated receptacle the hump is conveyed, and covered, about a foot deep, with earth and ashes. A strong fire is again built over the spot, and, supposing these preparations to be begun on the evening of one day, the hump will be ready for eating by the next day at noon. The tongues and marrow-bones are regarded by the connoisseurs as next in excellence.

Herds, consisting of thousands of these fine animals, still roam over the far western prairies, led by the fiercest and most powerful of the bulls. During the sexual season, the noise of their roaring resembles thunder, and the males often fight desperate battles

with each other. While feeding, they are often scattered over a vast surface; but, when they move forward in mass, they form a dense, impenetrable column, which, once fairly in motion, is scarcely to be turned. They swim large rivers nearly in the same order in which they traverse the plains; and, when flying from pursuit, it is in vain for those in front to halt suddenly, as the rearward throng dash madly forward and force their leaders on. The Indians sometimes profit by this habit: they lure a herd to the vicinity of a precipice, and, setting the whole in rapid motion, they terrify them, by shouting and other artifices, to rush on to their inevitable destruction. Numerous tribes of Indians are almost wholly dependent on these animals for food, clothing, tents, utensils, &c. Vast multitudes of bisons are slaughtered annually; but it is to be deeply regretted, that the white hunters and traders are in the habit of destroying these valuable beasts in the most wanton and unnecessary manner. It is common for such persons to shoot bisons, even when they have abundance of food, for the sake of the tongue or hump alone, or even because the animals come so near as to present a fair aim. It is therefore not to be wondered that, from all causes of diminution, the bison should become less numerous every year, and remove farther and farther from the haunts of men. The preference always given to the cows, which are too often shot while gravid, operates powerfully in thinning the herds.

The skins of bisons, especially that of the cow, dressed in the Indian fashion, with the hair on, make admirable defences against the cold, and may be used for blankets, &c. They are called *buffalo robes;* the term *buffalo* being generally, but inaccurately, applied to the bison. The wool of the bison has been manufactured into hats, and has also been employed in making coarse cloth. The time cannot be very far distant when this species, like the Indian tribes which hover near them, will have passed away, and the places which know them now shall know them no more.

BISSAGOS, The, or Bijuga Islands, a group of small volcanic islands, about twenty in number, near the W. coast of Africa, opposite the mouth of the Rio Grande, between lat. 10° and 12° N., and lon. 15° 30′ and 16° 30′ W. The largest is about 15 miles in length. Most of them are inhabited, but some of them are merely bare rocks. The inhabitants cultivate maize, and have plantations of bananas and palms, but their chief dependence is on their fisheries.

BISSET, Robert, a native of Scotland, educated at Edinburgh for the clerical profession. He took the degree of LL.D., and became a schoolmaster at Chelsea; but not succeeding in that occupation, he employed himself in writing for the press. His chief productions are—a History of the Reign of George III., six vols. 8vo; the Life of Edmund Burke, two vols. 8vo; and an edition of the Spectator, with lives of the authors, six vols. He died in 1805, aged forty-six.

BISSEXTILE. See Leap Year.

BITAUBÉ, Paul Jérémie; born at Königsberg, in Prussia, 1732, of French parents. He translated Homer into French. In consequence of this translation, and the recommendation of D'Alembert, he was elected a member of the Academy at Berlin. Frederic II., king of Prussia, favoured him much, and allowed him to stay a long time in France, to finish several translations from the German into French. Among his translations is one of Goethe's Hermann and Dorothea. Napoleon conferred marks of favour on him. He died in 1808. His works appeared in nine vols., Paris, 1804.

BITHOOR, or Bittoor, a town India, 12 miles N.W. of Cawnpore, on the right bank of the Ganges. Since the late mutiny it has had a notoriety conferred on it from being the residence of the miscreant Nana Sahib, also styled the Rajah of Bithoor. The town was long the abode of a line of Mahratta chiefs, the last of whom died without issue in 1851. His adopted son Nana Sahib, whose proper name, however, was Dhundoo Punt, claimed the succession, but his title was ignored by the East India Company, a proceeding which is believed to have stimulated him to his subsequent deeds of atrocity. General Havelock gained a brilliant victory over the rebels in the vicinity, and subsequently quantities of treasure belonging to the Nana were discovered by the troops in a well close to the palace.

BITHYNIA, a country in Asia Minor, lying on the Pontus Euxinus, the Thracian Bosporus, and the Propontis, and bounded on the S. by Phrygia. In early times it was called *Bebrycia*, from the Bebrycians who inhabited it. Before the time of Crœsus, Bithynia was an independent state, under its own princes. After the death of Prusias I., in the war against Crœsus, it fell into the power of the Lydians, B.C. 560; into that of the Persians, B.C. 555; and into that of Alexander, B.C. 334. The restorer of the Bithynian throne was Bias or Bas, a native prince, at the court of one of whose successors, Prusias II., Hannibal took refuge, and where he ended his life by poison, B.C. 183. Nicomedes, the last king of this race, bequeathed his kingdom to the Romans, B.C. 75. The famous cities of Nicomedia, Nicæa, and Heraclea were in Bithynia. In the eleventh century Bithynia was conquered by the Seljuks. In 1298 a new kingdom was founded there by the Ottoman Turks, of which, in 1327, Prusa was the capital.

BITLIS. See Betlis.

BITON, a Greek mathematician, of uncertain date, but supposed to have been a contemporary of Archimedes, wrote a work of some interest on warlike engines, and dedicated it to Attalus, king of Pergamos. It is extant in the Mathematici Veteres of Thevenot.

BITONTO (ancient *Butuntum*), a town in the kingdom of Italy, in the province of Bari, in a fine plain, 15 miles W.S.W. from Bari. It is the seat of a bishop, and has a handsome cathedral, twelve parish churches, convents for both sexes, an hospital, and a seminary. The environs produce excellent wine, called Zagarello. A short distance from the town the Spaniards gained a decisive victory over the Austrians, May 25, 1734. Pop. in 1872, 24,978.

BITSCH, a city, formerly in France, now in German Lorraine, with 3000 inhabitants, and a strong citadel on a hill, fortified by the art of Carmontaigne. It was ceded to Germany in 1871.

BITTERN (*Botaurus*), the name applied to several birds of the heron family (Ardeidæ). The bitterns have the bill strong, about as long as the head, compressed, and higher than it is broad; legs, as compared with other members of the family, rather short; neck comparatively short, covered on its sides and front with long loose feathers, which can be erected at pleasure. They are all birds of solitary habits, haunting wooded swamps and reedy or rushy pools and marshes, remaining concealed during the day and coming out at night to feed. The common bittern (*B. stellaris*) is especially remarkable for the booming or bellowing sound it makes, which has gained it popular and expressive names in different countries—such as mire-dram in England, and Rohrdommel in Germany. This cry is compared by Mudie to 'a burst of uncouth and savage laughter, piercingly or rather gratingly loud, and so unwonted and odd that it sounds as if the voices of a bull and a horse were combined, the former breaking down

his bellow to suit the neigh of the latter.' The bird rises in the air in a spiral while uttering this strange cry, stengthening its voice as the circles widen, and allowing it to sink as they contract. The bittern is about 28 inches in length, and about 44 in extent of wing, and is heavier in proportion to its wings than the heron. The general colour of the plumage is dull pale yellow, variegated with spots and bars of black; the feathers on the crown black, shot with green, those on the hinder part of the head and neck and on the breast long and loose; tail short; bill about 4 inches long; toes and claws long and slender, the middle claw being serrated on the inner edge. It feeds on small fishes, reptiles, snails, &c., and is an inoffensive and retiring bird, seldom seen unless when, as sometimes happens, it is frozen out during severe weather. The nest is placed in a loose tuft or bush near the water, and is constructed of rushes, reeds, grasses, and such-like materials. The eggs are four or five in number, and of a greenish-brown colour. The bittern was a favourite bird of sport when hawking was in vogue, and was protected by severe penalties. The little bittern (*B. minutus*) is the smallest bittern that occurs in Britain. It is a native of the S. of Europe, the S.W. of Asia, and probably of Africa generally. It is not more than 15 inches in length. The male has the head, back, and tail black, with green reflections; the neck, breast, and thighs buff; the rest of the under parts white. The female is brown above. It is a pretty rare visitant in Britain. The American bittern (*B. lentiginosus*) has also been found in Britain. It has some resemblance to the common bittern, but is much smaller and more minutely freckled.

BITTERN is the name given to the syrupy residue from evaporated sea-water after the common salt has been taken out of it. The syrup contains salts of magnesium, which give it a bitter taste, and it is employed as a source of them. It is also one of the sources of bromine.

BITTERSWEET, or WOODY NIGHTSHADE. See NIGHTSHADE.

BITUMEN, the name of a species in mineralogy, the individuals composing which have acquired several distinct names from their diversity in appearance. This depends chiefly upon their state of aggregation, which forms an uninterrupted series from the perfectly fluid to the solid condition.

Naphtha, the most fluid variety, is nearly colourless, or of a yellowish tinge, transparent, and emits a peculiar odour. It swims on water, its specific gravity being from 0·71 to 0·84. It burns with a bluish-white flame and thick smoke, and leaves no residue. It consists of carbon 82·20, and hydrogen 14·80. It is found on the peninsula of Apsheron, upon the western shore of the Caspian Sea, where it rises through a marly soil in the form of vapour, and, being made to flow through earthen tubes, is burned for the purpose of assisting in the preparation of food. It is collected by sinking pits several yards in depth, into which the naphtha flows. It is burned in lamps by the Persians instead of oil. With certain vegetable oils, naphtha is said to form a good varnish.

The variety *petroleum* is more abundant than naphtha, from which it appears to differ only by being thicker. In consistence it resembles common tar. It is of a strong disagreeable odour, and blackish or reddish brown in colour. It occurs, oozing out of rocks, in the vicinity of beds of coal, or floating upon the surface of springs. The strata from which this oil proceeds belong to the Devonian formation, and lie under the sandstone and limestone strata. The existence of this oil was known to the ancients, and Herodotus makes mention of oil-springs in the island of Zante; but it is only within the last few years that it has been applied to any great extent to practical purposes. Springs of petroleum are now known to exist in many different parts of the world—in Europe, Asia, Africa, and above all in America. In Europe the principal places in which it is found are Alsace, Neufchatel in Switzerland, several parts of Italy, and very largely in Galicia. In Asia petroleum is found most abundantly in the Birman Empire, where the wells have been worked for centuries. The yearly product is now said to be about half a million hogsheads, each 6 cwts. But no region is so rich in petroleum, or possesses it in a situation so convenient for commerce, as the so-called great basin in North America extending from the Western Alleghanies to the Rocky Mountains, and from the valley of the Little Kanawha in Virginia to Lake Ontario. Venango county, with the Oil-creek in Pennsylvania, and the valley of the Kanawha in Virginia, are particularly productive. The first petroleum wells in America were discovered in 1859, and since that time it has risen to be a leading article in the foreign trade of the United States.

Elastic bitumen is soft, flexible, and elastic. It emits a strong bituminous odour, and its specific gravity is about the same as that of water. On exposure to the air it becomes hard, and loses its elasticity. It is sometimes called mineral caoutchouc, because it takes up the traces of crayons in the same manner as the caoutchouc or indian-rubber. It is found in the lead-mines of Derbyshire, at St. Bernard's Well, Edinburgh, in France, and elsewhere.

Compact bitumen, or *asphaltum*, is of a shining black colour, solid, and brittle, with a conchoidal fracture; specific gravity 1 to 1·6. Like the former varieties, it burns freely, and leaves but little residue. It is found in Judea, in the Palatinate, in France, in Switzerland, and in large deposits in sandstone in Albania. In the island of Trinidad it forms a lake three miles in circumference, and of a thickness unknown. The bricks of which the walls of Babylon were built were cemented with hot bitumen. The well-known asphalt pavement is formed by mixing melted bitumen with gravel.

BIVALVE SHELLS, or BIVALVES. See MOLLUSCA.

BIVOUACK (from the German *beiwacht*), the name given to the modern system by which the soldiers in service lie in the open air without tents, in opposition to the old system of camps and cantonments. They remain dressed in order to be ready at a moment's warning to take their places in order of battle. Tents being laid aside, on the continent of Europe, for the sake of diminishing the baggage of an army, large masses of troops are always obliged to bivouack, even if they are not near the enemy. The soldier, however, is permitted to build himself a hut of straw or branches if circumstances allow it. Frequent bivouacking is very injurious to the health, and is also a great disadvantage to the countries in which it takes place.

BIZERTA, or BENZERTA (ancient *Hippo Zarrhytus*), a sea-port town and bay, regency of Tunis. The town stands on the W. side of the bay, 35 miles N. by W. of Tunis, and is the most northern town of Africa. It is about a mile in circumference, and is fortified towards the sea by several castles and batteries, which however are all but useless as defences, in consequence of being commanded by a hill at the distance of a quarter of a mile. Bizerta was formerly one of the best ports in Tunis; and is still good, though now seldom frequented, except by small vessels. A lake, or rather lagoon, runs from the bay a considerable distance into the land, and is said to have a depth, in some places, of 40 to 50 fathoms; but its entrance from the sea is narrow,

and has not more than 9 feet over the bar. The country around is singularly beautiful and fertile, producing corn, pulse, oil, cotton, and fruits in great abundance. Pop. about 10,000.

BJÖRNSTJERNA, MAGNUS FREDERICK FERDINAND, COUNT, a Swedish statesman and author, born in 1779, at Dresden, where his father, afterwards plenipotentiary at the diet of Ratisbon, was then secretary to the Swedish legation, was educated in Germany, and in 1793 proceeded to Sweden to enter the army. During the Finnish war he displayed great gallantry, and rose to the rank of major. After the peace he was sent in 1809 on a secret embassy to Napoleon, with whom he had an interview the day after the battle of Eckmühl. In 1812, when in London, he managed the transaction for the sale of Guadaloupe, and in 1813, with the rank of colonel, accompanied the Swedish army to Germany. Here he was ordered to relieve Hamburg and defend the Four Territories (Vierlande), but was obliged to retire on the main body of the northern army. He was present at the battles of Grossbeeren and Dennewitz. When the army advanced to the Elbe he was the first to effect a passage and take possession of Wörlitz, though he was afterwards obliged to abandon it to the enemy. At the storming of Dessau two horses were shot under him, and he received a severe contusion from a cannon-ball. He was able, notwithstanding, to be present at the battle of Leipzig. He afterwards concluded the capitulation of Lübeck with General Lallemand, and received the surrender of the fortress of Maestricht. After the capitulation of Paris he fought first in Holstein, and then in Norway, till at last he concluded with Prince Christian Frederick at Moss the convention which was followed by the union of Norway and Sweden. In 1815 he became adjutant-general, and was made a baron. In 1820 he obtained the rank of lieutenant-general, in 1826 was made a count, and in 1828 was appointed plenipotentiary at the court of Great Britain. Here he continued till 1846, when he returned to Stockholm. He died in 1847. As an author he is chiefly known in politics as the advocate of a moderate liberalism and temperate reform of the representative system. On general subjects his most interesting works are The British Rule in the East Indies, and the Theogony, Philosophy, and Cosmogony of the Hindoos.

BLACK. See COLOUR.

BLACK, JOHN, the well-known editor of the Morning Chronicle, was the son of a Berwickshire shepherd, and born in the Lammermoors in 1783. Left an orphan at the age of twelve, he was placed in the office of a writer in Dunse, and from thence proceeded to a similar employment in Edinburgh, where he continued for several years. During this period he devoted himself assiduously to the pursuit of knowledge, making considerable progress in classical studies, and also acquiring the German and Italian languages. In 1810 he removed to London, where he became engaged as parliamentary reporter for the Morning Chronicle, and ultimately rose to be its editor. His editorial management was noted for its fearlessness and independence. He died on 25th June, 1855, having previously retired from the editorship of the paper in 1843. Mr. Black was the author of a life of Tasso, and also translated the lectures of the brothers Schlegel on Dramatic Art and Literature, and on the History of Literature, Ancient and Modern.

BLACK, JOSEPH, a distinguished chemist, born at Bordeaux, of Scottish parents, in 1728, studied medicine at Glasgow. Dr. Cullen, his instructor, inspired him with a taste for chemical studies. In 1754 he was made Doctor of Medicine at Edinburgh, and delivered an inaugural dissertation, De Humore Acido a Cibis Orto et Magnesia Alba, in which he ascribes the difference between the mild and caustic alkalies to the presence of fixed air (carbonic acid) in the former. In 1756 he extended and republished his Experiments on White Magnesia, Quicklime, and several other Alkaline Substances, in the second volume of the Essays, Physical and Literary, of the Edinburgh Society. The discovery of carbonic acid is of interest not only as having preceded that of the other gases made by Priestley, Cavendish, and others, but as having preceded in its method the explanation given by Lavoisier of the part played by oxygen in combustion. About 1757 Black enunciated his doctrine of latent heat, which has led to such important results. In 1756 he was appointed professor of medicine and lecturer on chemistry in the University at Glasgow in the place of Dr. Cullen; and in 1766, when Cullen left the professor's chair in Edinburgh, he was there also succeeded by Black. No teacher inspired his disciples with such a zeal for study; his lectures, therefore, contributed much to make the taste for chemical science general in England. He died Dec. 6, 1799, at the age of seventy-one. Upon Lavoisier's proposal, the Academy of Sciences in Paris had appointed him one of its eight foreign members. His habits were simple and methodical, his character undemonstrative. With his characteristic caution and love of accuracy, Black did not adopt the Lavoisierian system until he was satisfied that it was more accurate than that of which he had been so long a teacher. In his later courses, however, he taught the antiphlogistic system. Two or three papers by Black appeared in the Transactions of the Royal Societies of London and Edinburgh; two letters were published by Bull and Lavoisier; and his Lectures on Chemistry, in two vols. 4to, by Robison in 1803.

BLACKADDER, JOHN, a distinguished preacher among the Scottish Covenanters, was born in the year 1615. Having been duly licensed by the Presbyterian Church, then in its highest purity and most triumphant domination, he received a call in 1652 to the parish church of Troqueer, in the neighbourhood of Dumfries. In 1662 the episcopal form of church government was forced by the restored house of Stuart upon a people who were generally repugnant to it. Mr. Blackadder, so far from complying with the new system, employed himself for several successive Sundays in exposing what he considered its unlawfulness, and, in his own words, entered his 'dissent in heaven' against it. He and some of his brethren were conducted in honourable captivity to the capital, where he underwent some examinations, but was speedily released by the interest of his friends. He was now, however, obliged to demit his charge in favour of an Episcopal incumbent, and went with his wife and numerous family to reside at Caitloch, in the parish of Glencairn, a wilder and more central part of the stewartry of Kirkcudbright. In 1670, having performed worship at a conventicle near Dunfermline, where the people had armed themselves for self-defence, he was summoned before the privy-council, but contrived to elude their power, and when the search was a little slackened, he renewed his practice of itinerant preaching. On one occasion he preached at Kinkell, near St. Andrews; the people flocked from the metropolitan city to hear him, notwithstanding all the injunctions and *surveillance* of Archbishop Sharpe. It is said, that on Sharpe desiring the provost to send out the militia to disperse the congregation, he was informed that it was impossible—the militia had gone already as worshippers. In 1680 he made a voyage to Holland, and settled his son at Leyden, as a student of medicine. After spending several months in Holland,

he returned to Scotland, and in the succeeding year was apprehended, and confined in the state prison upon the Bass, where he died in December, 1685, having nearly completed his seventieth year. See Crichton's Life of Blackadder, 1823, 12mo.

BLACKBIRD (*Turdus merula*), called also the *merle*, as in Sir Walter Scott's ballad of Alice Brand:—

> "'Tis merry, 'tis merry, in the good green wood,
> When mavis and merle are singing,'

one of the commonest and most esteemed of British song-birds. It belongs to the same family (Turdidæ) as the thrush, missel thrush, fieldfare, &c., all of which are members of the tribe Dentirostres, and the order Passeres or perching birds. It inhabits Europe, the N. of Africa, and the Azores, taking up its abode among plantations and copses near the dwellings of man. It is rather a shy bird, and does not care to show itself much, darting quickly with a sharp chatter of alarm from one cover to another, when startled by the appearance of an intruder. Its size is greater than that of the common thrush, but inferior to that of the missel thrush, its length being about 11 inches. The colour of the male bird ('the ousel-cock so black of hue with orange tawny bill' of Bottom the weaver) is a uniform deep black, relieved only by the bright orange yellow of the bill and circle round the eyes. The female has the bill and circle round the eyes blackish brown, the throat yellowish brown, and the under parts rusty brown. The young birds resemble the females, and the males do not acquire the yellow bill till after the second moult. The nest is built early in spring, such situations being chosen for it as a thick hedgerow, a low close bush, an ivied tree or wall, and even the side of a dry ditch. The materials of which it is built are moss, fibrous roots, and small sticks, strengthened internally by a coating of mud, and lined inside with fine dry grass. The eggs are generally four or five in number, of a greenish-blue colour, spotted with various shades of brown, and very variable in hue and markings. The song of the blackbird is a fine, rich, mellow, and flute-like strain; but is neither so varied nor so continuous as that of the thrush. It is heard for a considerable period of the year, as two or three broods of young blackbirds are annually produced, and the male bird sings during the breeding season. It has good powers of mimicry, and is not only able to imitate the notes of other birds, but can be taught to whistle tunes, and even to utter words. It feeds on insects, worms, snails, &c., and is particularly fond of strawberries, cherries, pears, and other fruits, thus rousing the ire of the gardener, and bringing destruction upon itself. It may be questioned, however, whether the mischief it does is not fully counterbalanced by the services it performs in destroying snails and other pests of the garden. It is certainly annoying to see our finest fruits devoured before our eyes; but it is better and wiser to protect them by nets, than to sacrifice the poor blackbirds. In winter snails form a large part of their food, and they are very dexterous at breaking the shells against a stone, in order to come at the animal. Albinos, or white blackbirds (rather a contradiction in terms), with red eyes, are sometimes found. The blackbirds or crow-blackbirds of America are quite different from the European blackbird, and are more nearly allied to the starlings and crows. See CROW-BLACKBIRD.

BLACKBURN, a town, England, in Lancashire, 21 miles N.N.W. from Manchester, with a pop. in 1871 of 76,337. It is pleasantly situated in a sheltered valley, and is very irregularly built. The parish church of St. Mary's is spacious and elegant, and is surmounted by a lofty square tower. The other principal churches are St. John's, St. Peter's, St. Paul's, St. Michael's, Holy Trinity, and Christ Church. One of the Roman Catholic churches is a beautiful Gothic building; St. George's Presbyterian Church is a handsome structure with a fine spire. There is a free grammar-school, founded by Queen Elizabeth in 1557, and a free school for girls, founded by William Leyland in 1765. The town-hall, the infirmary, the exchange, and the union workhouse are all new and handsome buildings. Within a third of a mile from the town-hall is the public park, called the Corporation Park, of 30 acres, beautifully situated on the declivity of Revidge Hill. The railways, which branch out in every direction, afford great facilities for traffic. They all converge and pass through one large railway station belonging to the Lancashire and Yorkshire Railway Company. The staple manufacture is cotton goods, in the manufacture of which 1,000,000 spindles and 30,000 power-looms are employed, producing weekly in the town and vicinity 200,000 pieces, of an annual value of about £5,000,000. James Hargreaves, the inventor of the spinning-jenny, was a weaver at Stanhill, near Blackburn.

BLACK-CAP (*Sylvia atricapilla*, or *Curruca atricapilla*), a songster which rivals, and by some is even preferred to the nightingale. It is nearly 6 inches long, and has the upper part of the head black, the hind part of the neck ashy brown, the upper parts of the body dark gray, with a greenish tinge, the throat, breast, and belly more or less silvery white, the legs bluish, the claws black, the irides dark hazel, and the bill brown. The female is larger, and has a generally darker plumage than the male. The black-cap is met with in most parts of Europe, particularly the N. and E.; it is only found in England from the beginning of April to September. Its favourite haunts are gardens, orchards, and thick hedges, and its favourite food ivy berries, though for these it readily substitutes currants and other small garden fruits, and feeds also on the grubs of moths. Its nest, built generally among brambles and nettles, or in some low bush, is formed of a little moss, dried grass, and wool, lined with fibrous roots and some long hairs; its eggs, from five to six, are reddish-brown, mottled with a deeper colour, and sometimes dotted with a few ashy specks. In its natural state it is a mocking-bird, and in a cage soon learns the notes of the nightingale and canary. Bechstein, while admitting that it has less volume, strength, and expression than the nightingale, considers its tones more pure, easy, and flute-like, and its song perhaps more varied, smooth, and delicate.

BLACK CHALK. See SLATE.

BLACK COCK. See GROUSE.

BLACK DEATH. See PLAGUE.

BLACKFISH, a species of fish caught on various parts of the American coast, especially in the vicinity of Long Island, whence large supplies are obtained for the New York market. The specific name is *Tautoga Americana*. The common name, *blackfish*, is bestowed on account of the colour of its back and sides, which are of a bluish or crow black; the lips, lower jaw, neck, and belly, especially in the males, are white. The mouth is rather small, the lips skinny or fleshy, and the teeth are about twelve in number in each jaw, the two front teeth being largest, and the rest of the respective rows gradually decreasing in size. Within the external ranges are the points of smaller teeth, inserted with rather less regularity: they are sharp, distinct, and covered by the lips. The tongue is white, smooth, lying close, but discoverable by raising; tail entire, and somewhat convex, the middle rays being somewhat more

prominent than the upper and lower ones; gill covers smooth, neither scaly, serrated, nor rough; extremities of the pectoral fins whitish; eyes rather small. The blackfish is plump in appearance, and is much esteemed for the table. It varies in size, from 2 or 3 lbs. to 10 or 12 lbs. Rocks, reefs, and rough bottoms of the sea, in the neighbourhood of the coasts, are the situations most frequented by the blackfish, which appear to be stationary inhabitants of the salt water, as they do not, like the salmon, herring, &c., desert their haunts to visit the fresh-water rivers. These fish are caught in abundance along the whole of Long Island Sound, Fisher's Island Sound, and in Narragansett Bay. They are also found in the southern bays of Long Island, and on the ocean banks of Sandy Hook. In catching blackfish, the hand-line is generally used, though the rod may often be advantageously employed: they seize the bait greedily, at proper seasons, and pull strongly, in proportion to their size and weight. They are occasionally taken in seines.

Another fish, the *Centrolophis morio*, is also called blackfish. It is a native of the Mediterranean, but is also sometimes found on the British coast. It belongs to the mackerel family (Scomberidæ), and varies in size, some specimens being 15 inches long, and others more than double that size. It is of a black colour, the fins intensely so; the under parts are rather paler.

BLACK FOREST (in German, *Schwarzwald*), a chain of mountains in the grand-duchy of Baden and the kingdom of Würtemberg. It runs almost parallel with the Rhine, from S. to N., often only from 15 to 20 miles distant from this river; is about 85 miles long, and from E. to W. in the southern part, about 30 miles wide; in the northern about 18. The Danube rises in these mountains, as well as many other rivers. Those on the W. side run into the Rhine, those on the E. side into the Danube. The Black Forest is rather a chain of elevated plains than of isolated peaks. The highest summit, the Feldberg, measures 4900 English feet. Except from June to September, these mountains are generally covered with snow, and even during this period are not entirely free from it. Among the many valleys of this chain, the Murgthal is particularly celebrated for its beautiful scenery. The whole chain consists of primitive mountains: its skeleton throughout is granite; its higher points are covered with sandstone, and other layers of less consequence, and are surrounded by heights composed of floetz rocks. On the western side, at the foot, appears gneiss. Porphyry and clay-slate are found on several heights, as likewise silver, lead, copper, iron, cobalt, and mineral waters. The woods are abundant, and consist mostly of pines and similar species. The raising of cattle is the principal branch of husbandry carried on in this district. The ground is not fertile, and the inhabitants scattered over the mountains live extremely frugal, but are very industrious. Their manner of living, building their houses, and cultivating their lands, is very peculiar. Till the seventeenth century there was no spirit of trade or industry among them; but it was developed by the wars of that period. The vast quantity of timber has now become a considerable source of revenue. The wood of the Black Forest was always highly prized by the Dutch, and the export to Holland is still carried on by companies, who convey it down the Rhine in the form of rafts. The yearly value of the export is about 3,000,000 florins (£250,000). Next after the trade in timber, the manufacture of the well-known wooden clocks, toys, &c., is the most important branch of industry, in which there are now about 40,000 persons employed. More than 600,000 of these clocks and other wooden ware are manufactured every year. Neustadt and Furtwangen are the central points of this singular commerce, which embraces all Europe, and extends even to America. Large numbers of these clocks are sent to Spain and Portugal, from whence they go to South America. From the N. of Germany and from Havre they are exported to the United States. Of late, the clocks have been much improved, and the correctness of some of them, made of different woods, in order to counteract the influence of the weather, is surprising.

Two passes of the Black Forest became particularly noted in the time of the French revolution—the Kniebis and the Holle passes. The former, at the foot of the Murg, was taken in 1796 and 1797; the latter is famous for Moreau's skilful retreat through it in 1796.

BLACKFRIARS' BRIDGE, one of the six fine bridges of London, over the Thames. The old bridge was built between 1760 and 1768, after a design of Mr. Robert Mylne; but this has been replaced by a new one, opened in 1869, which will be found represented in Pl. XIX. The old bridge had nine arches, the centre one being 100 feet wide. The whole length was 995 feet. Over each pier was a recess, supported by Ionic pillars. Blackfriars' Bridge is situated at about an equal distance from those of Southwark and Waterloo, and contiguous to the noble iron bridge of the London, Chatham, and Dover Railway. The site of the new bridge is the same as that of the old, and commands a very fine view of St. Paul's Cathedral, as well as of both sides of the river, including the Tower, the Monument, Somerset House, Westminster Abbey, and about thirty churches. See BRIDGE.

BLACKGUARD. This name was originally given to the scullions, coal-carriers, and other low menials in great houses; hence the modern use.

BLACKHEATH, a village and well-known heath, England, county of Kent, the former about 6 miles S.E. of London, with which it is connected by the North Kent Railway, pleasantly situated on a gentle slope on the verge of the heath. It consists of one principal street, spacious, but irregular; the houses plain, and mostly of brick. Close by is Morden College, a quadrangular red brick building, founded by Sir John Morden for the benefit of decayed Turkey merchants. The *heath* contains about 70 acres within its present limited bounds. It is very picturesque, and in summer is much resorted to by pleasure parties, donkey-riding being one of the amusements for which it is well adapted. It commands beautiful views of London and the banks of the Thames, and is bordered by numerous rows of elegant villas. This celebrated heath has been the scene of many remarkable events, such as the insurrections of Wat Tyler and Jack Cade, and was formerly a notorious resort of highwaymen.

BLACKING, the article employed in blacking boots and shoes, usually contains for its principal ingredients oil, vinegar, ivory or bone, black sugar or molasses, and strong sulphuric acid, though every manufacturer has his own recipe, and endeavours to turn it to best account by concealing its composition and puffing its merits. In this way several large fortunes are understood to have been made. Blacking is used either liquid or in the form of a paste, but both are obtained from the same ingredients, the only difference being that in making the paste a portion of the vinegar is withheld. One celebrated blacking, which bears the name of patent, consists of 18 oz. of caoutchouc dissolved in 9 lbs. of hot rape-oil, 60 lbs. ivory-black, 45 lbs. molasses, and 20 gallons vinegar of strength No. 24, in which 1 lb. finely

ground gum-arabic has been dissolved. The whole mixture, after being carefully triturated in a paint-mill, receives 12 lbs. sulphuric acid, in small successive quantities, stirring strongly for half an hour. The stirring is continued for half an hour daily during a fortnight, and then 3 lbs. of gum-arabic are added, after which the stirring is resumed, and continued as before for another fortnight. This gives fine liquid blacking; the paste is obtained within a week by only withholding 8 of the 20 gallons in which the gum-arabic is dissolved.

BLACK LEAD. See PLUMBAGO.

BLACKLOCK, THOMAS, a poet, remarkable for his literary attainments under the misfortune of a deprivation of sight, was born at Annan, in the county of Dumfries, in 1721. His parents, who were natives of Cumberland, although poor were industrious and well-informed. At the age of six months he lost his sight by the small-pox; and as he grew up, his father, with exemplary industry and affection, endeavoured to lessen his calamity by reading to him such books as instructed or entertained him, when he always appeared to be particularly pleased with the works of Spenser, Milton, Prior, Pope, and Addison. At the age of twenty he lost his father, on which he was invited by Dr. Stephenson, a physician in Edinburgh, to visit that metropolis, in order to pursue his studies at the university. In 1754 he brought out an edition of his poems, which gained him the patronage of Mr. Spence, who wrote an account of his life, character, and productions; and a quarto edition of his poems being soon afterwards published by subscription, a considerable sum was thereby raised for his benefit. He now devoted himself to the study of theology, and, having passed through the usual course, was licensed, in 1759, by the presbytery of Dumfries. In 1762 he married the daughter of Mr. Johnson, surgeon, of Dumfries: a connection which proved to him a source of comfort and felicity for the remainder of his life. He was soon after appointed minister of Kirkcudbright, on the presentation of the Earl of Selkirk; but being opposed by his parishioners, after two years' contention he resigned his living, upon a moderate annuity, and retired to Edinburgh, where he adopted the plan of receiving a few students of the university as boarders, and of assisting them in their studies when desirable. In 1766 he was created D.D.; and having now taken a respectable station among the literati of Scotland, he maintained it by various publications until his death, July, 1791, at the age of seventy. Blacklock wrote, besides his poems, several prose works.

BLACKMORE, SIR RICHARD, a physician and poet of notoriety, if not of eminence, was the son of an attorney in the county of Wilts. In 1668 he entered the University of Oxford. In 1697 he had risen to so much eminence as a physician as to be appointed physician to King William, who knighted him. The preceding year he had made himself known, as a poet, by the publication of his heroic poem of Prince Arthur, which was soon followed by King Arthur; and in 1700 he published a paraphrase of the book of Job, in folio; as also a poem entitled a Satire on Wit, being an attempt to retort on the wits by whom he had been very successfully assailed. By the strictness of his whiggish principles, he had incurred the resentment of the Tory junto, composed of Swift, Pope, Arbuthnot, and others; while something solemn in the complexion of his religion and morality, added to the real absurdity of starting epic after epic in quick succession, insured the raillery of all those to whom his gravity, perseverance, and mediocrity afforded so much subject for ridicule. This worthy man and middling poet became the common butt of his day, and for almost two generations, for Pope took up the quarrel which Dryden began. The work which produced him the greatest reputation was the Creation, a poem in seven books, which went through several editions, and was greatly applauded, but is, generally speaking, very tamely elaborate. In 1721 he published a New Version of the Psalms of David, which, although recommended by authority, has never been adopted. He died, at an advanced age, in 1729, leaving behind him the character of a pious, well-meaning, and respectable man of limited genius and little taste.

BLACKPOOL, a town in England, coast of Lancashire, between the estuaries of the Ribble and Wyre, 27 miles S.S.W. of Lancaster, which has of late years attracted many visitors by its advantages as a watering-place. It is elevated considerably above the sea at low-water; affords excellent accommodation for visitors in the numerous hotels and lodging-houses, a range of lofty houses about 1 mile long facing the sea. The streets are wide, well paved, and lighted with gas, and the town is amply supplied with water. There are several churches and chapels for Methodists, Baptists, and Roman Catholics. There are also a court-house, two market-houses, and an arcade. Libraries and news-rooms are kept open during the bathing-season, and an excellent promenade has been formed; there are also two handsome piers. The air is healthy and bracing. The number of persons that visit Blackpool annually is said to exceed 100,000. Stationary pop. 6100.

BLACK PRINCE. See EDWARD.

BLACK ROD, USHER OF THE, an officer of the House of Lords, appointed by letters patent from the crown, and employed to execute orders for the commitment of parties guilty of breach of privilege and contempt, and to assist at the introduction of peers and other ceremonies. His proper title is gentleman-usher; that of his deputy, yeoman-usher.

BLACK SEA, with the ancients known by the name of *Pontus Euxinus* (which see); a sea which is situated between Europe and Asia, bounded on the W. by Turkey, N.W. and N. by the Russian dominions, on the E. by Mingrelia and Guriel, on the S. by Natolia, being connected with the Mediterranean by the Bosporus, and by the Cimmerian Bosporus with the Sea of Azoph (which see), which is, in fact, only a bay of the Black Sea. The area of the Black Sea and the Sea of Azoph amounts to about 180,000 square miles. The water is not so clear as that of the Mediterranean, and, on account of the many large rivers which fall into it,—the Danube, Dniester, Dnieper, Don, and Cuban,—being less salt, freezes more readily. The tempests on this sea are tremendous, as the land which confines its agitated waters gives to them a kind of whirling motion. In the winter it is so boisterous, particularly near the coast from the Danube to the Crimea, that it is scarcely navigable, even by the most experienced sailors. In 1854 one of its tremendous storms occasioned a very serious loss to the shipping of the allied British and French. The Black Sea contains no islands; there is one, however, in the Cimmerian Bosporus. The fisheries in the Sea of Azoph and the Black Sea are not unimportant, various kinds of valuable fish both large and small, being taken; among others, several species of sturgeon. Seines are used, in which 60,000 fishes are sometimes caught within six hours; but there are never many large ones among them. Caviare (which see) is also made on the coast, as well as fish-glue, fish-oil, and, from the spawn of the sea mullet, botargo; the latter, however, only in small quantity. The salt and smoked mackerel form an important article of the commerce of the Crimea. Raoul-Rochette published in Paris, 1822, a work on the remarkable Grecian antiquities

on the northern shore of the Pontus, which was corrected and completed by the Russian councillor Peter von Koppen, Vienna, 1823. For further information on this subject, see also Voyage autour du Caucase, par M. Dubois de Montpereux, Paris, 1839, and Antiquities of Kertch, by D. M'Pherson, M.D., London, 1857.

BLACKSTONE, Sir William, Knight and LL.D., a celebrated English lawyer, and the most popular writer on the laws and constitution of his country, was born in London in 1723, and was the third son of Mr. Charles Blackstone, a silk mercer. He was educated on the foundation of the Charter House, whence in 1738 he was removed to Pembroke College, Oxford. He was much distinguished, both at school and at the university, and at an early age compiled a work for his own use, entitled the Elements of Architecture, which has been much praised. Having chosen the profession of the law, he was in due time entered at the Middle Temple, and on this occasion published the admired verses called the Lawyer's Farewell to his Muse, which appeared in Dodsley's Miscellany. In 1743 he was elected fellow of All-Souls College, Oxford, and in 1746 was called to the bar, and commenced the practice of law. Being deficient in elocution, and not possessed of the popular talents of an advocate, his progress was slow. Having attended the courts of law at Westminster for seven years, without success, he determined to quit the practice of his profession, and retire to his fellowship at Oxford. The system of education in the English universities supplying no provision for teaching the laws and constitution of the country, Blackstone undertook to remedy this defect by a course of lectures on that important subject; and the manner in which he executed the task has conferred a lasting distinction on Oxford. His first course was delivered in 1753, and was repeated for a series of years with increasing effect and reputation. These lectures doubtless suggested to Mr. Viner the idea of founding, by his will, a liberal establishment in the University of Oxford for the study of the common law; and Blackstone was, with great propriety, chosen the first Vinerian professor. His engagements at Oxford did not prevent his occasional practice as a provincial barrister; and in 1754, being engaged as counsel in a contested election for the county of Oxford, he was led into considerations on the elective franchise, which produced his work entitled Considerations on Copyholds. In this treatise he denied the right of copyholders to vote as freeholders; which led to a declaratory act of Parliament in establishment of that narrow doctrine. In 1759 he published a new edition of the Great Charter and Charter of the Forest, with an historical preface; and during the same year, the reputation which he had obtained by his lectures induced him to resume his attendance at Westminster Hall, when business and the honours of his profession soon crowded in upon him. In 1761 he was elected M.P. for Hindon, made king's counsel and solicitor-general to the queen. About this time he also married, and thereby losing his fellowship, was appointed principal of New Inn Hall; which office, with the Vinerian professorship, he resigned the next year. In 1765 he also published the first volume of his Commentaries on the Laws of England; a work of greater merit than any which had yet appeared on the subject. In this celebrated production the author does not confine himself to the humble duty of an expositor, but aspires to the higher character of a philosophical writer on jurisprudence; and having been preceded by no authors in the same line, his manner of accomplishing his task is entitled to great praise. It must not, however, be regarded as a philosophical investigation into the grounds and merits of the English laws and constitution, so much as an elegant exposition and defence of an existing system. Whatever he found instituted, it was his purpose to support and eulogize; and consequently we are rather made acquainted with the 'legal reasons' of what is established, than instructed in the general principles of national legislation. This mode of treating the subject may be, in some degree, useful, by conveying a due notion of the grounds on which government and usage have proceeded, but of course will do little to advance the mind of a nation, and often a great deal to nurture prejudices and impede amelioration. Notwithstanding some passages against standing armies, and in exposition of the progress of the influence of the crown, Blackstone is uniformly the advocate of prerogative, and very confined in his notions of toleration. The real merit and talents of Blackstone, backed by political tendencies which are generally favourable to advancement, now made him an object of ministerial favour, and he was offered the post of solicitor-general in 1770, and, declining it, was made one of the justices of Common Pleas, which station he held until his death in Feb. 1780, in his fifty-seventh year.

BLACKWELL, Alexander and Elizabeth, husband and wife. The former was son of a principal of Marischal College, Aberdeen, and was born about the beginning of the eighteenth century. He eloped with his wife to London, where he was first employed as a corrector of the press to Mr. Wilkins, an eminent printer. Afterwards he was enabled to set up as a printer on his own account, and for this purpose he occupied a large house in the Strand. But he did not long pursue this business before an action was brought against him for not having served a regular apprenticeship to it. The unsuccessful defence of this action ruined him, and one of his creditors threw him into jail. In this emergency the good genius of his wife came to his relief. She happened to possess a taste for drawing flowers; and the acknowledged want of a good herbal at that time (1735) occurred to her as affording the means of exerting this gift in a useful way. She accordingly hired a house near the botanic garden at Chelsea, where she had an opportunity of receiving the necessary flowers and plants in a fresh state, as she wanted them; and not only made drawings of the flowers, but also engraved them on copper, and coloured the prints with her own hands. Her husband lent all the aid in his power by attaching the Latin names of the plants, together with a short account of their principal characters and uses, chiefly taken by permission from Miller's Botanicum Officinale. The first volume of the work appeared in 1737, in large folio, containing 252 plates, each of which is occupied by one distinct flower or plant. The second volume, completing the number of plates to 500, appeared in 1739. It was afterwards republished on the Continent. After his release from prison Blackwell wrote a work on agriculture, which led to his being engaged to go to Stockholm, under the patronage of the King of Sweden. Having cured the king of an illness, he was appointed one of the royal physicians, and was apparently on the high road to fortune, when he was accused of being concerned in a plot against the constitution of the kingdom, and being condemned, was executed in 1747. The date of Mrs. Blackwell's death is not known.

BLACKWELL, Thomas, a learned writer of the eighteenth century, was brother of Alexander, noticed above, and born at Aberdeen, August 4, 1701. After receiving the rudiments of his education at the grammar-school of his native city, he entered his academical course at the Marischal College, where he took the degree of A.M. in 1718. A separate pro-

fessorship of Greek had not existed in this seminary previous to 1700. Blackwell, having turned his attention to Greek, was honoured in 1723, when only twenty-two years of age, with a crown appointment to this chair. He entered upon the discharge of the duties of his office with the utmost ardour. It perfectly suited his inclination and habits. He was an enthusiastic admirer of the language and literature of Greece, and the whole bent of his studies was exclusively devoted to the cultivation of polite learning. Dr. Blackwell first appeared before the public as an author in 1737. His Inquiry into the Life and Writings of Homer was published at London during the course of that year, but without his name. A second edition of the work appeared in 1746, and shortly after Proofs of the Inquiry into Homer's Life and Writings. These proofs chiefly consisted of a translation of the Greek, Latin, Spanish, Italian, and French notes subjoined to the original work. The Inquiry contains a great deal of research, as well as a display of miscellaneous learning. In 1748 he published anonymously Letters concerning Mythology. In the course of the same year he was advanced to be principal of his college. In 1750 he opened a class for the instruction of the students in ancient history, geography, and chronology. Prelections on these branches of education he thought necessary to render more perfect the course at Marischal College. He, therefore, himself undertook the task. The design of his opening this class evidently was to pave the way for the introduction of a new plan of teaching into Marischal College, which, accordingly, he soon after accomplished. In 1752 he obtained the degree of LL.D., and in the subsequent year published, in quarto, the first volume of Memoirs of the Court of Augustus. A second volume appeared in 1755, and a third, which was posthumous, and left unfinished by the author, was prepared for the press by John Mills, Esq., and published in 1764. Dr. Blackwell died at Edinburgh in 1757.

BLACKWOOD, ADAM, a learned writer of the sixteenth century, was born at Dunfermline in 1539. Scotland, during his youth, was undergoing the agonies of the Reformation. He therefore found it no proper sphere for his education; and went to Paris, where, by the liberality of his youthful sovereign, Queen Mary, then residing at the court of France, he was enabled to complete his studies, and to go through a course of civil law at the University of Toulouse. Having now acquired some reputation for learning and talent, he was patronized by James Beaton, the expatriated Archbishop of Glasgow, who recommended him very warmly to Queen Mary and her husband the dauphin, by whose influence he was chosen a member of the Parliament of Poitiers, and afterward appointed to be professor of civil law at that court.

Poitiers was henceforth the constant residence of Blackwood, and the scene of all his literary exertions. His first work was one entitled De Vinculo Religionis et Imperii, Libri Duo (Paris, 1575), to which a third book was added in 1612. His next work was entitled Apologia pro Regibus, and professed to be an answer to George Buchanan's work, De Jure Regni apud Scotos. He next published, in French, an account of the death of his benefactress, Queen Mary, under the title, Martyre de Maria Stuart Reyne d'Escosse (Antwerp, 8vo, 1588). At the end of the volume is a collection of poems in Latin, French, and Italian, upon Mary and Elizabeth; in which the former princess is praised for every excellence, while her murderess is characterized by every epithet expressive of indignation and hate. In 1598 he published a manual of devotions under the title, Sanctarum Precationum Procemia, which he dedicated to his venerable patron the Archbishop of Glasgow. In 1609 appeared at Poitiers a complete collection of his Latin poems. He died in 1613, in the seventy-fourth year of his age, and was splendidly interred in St. Porcharius' Church at Poitiers, where a marble monument was reared to his memory, charged with a long panegyrical epitaph. In 1644 appeared his Opera Omnia, in one volume 4to, edited by the learned Naudeus, who prefixes an elaborate eulogium upon the author. His brother Henry distinguished himself as a physician at Paris, and died in 1613.

BLACKWOOD, WILLIAM, an Edinburgh bookseller, well known as the projector and publisher of Blackwood's Magazine, was born at Edinburgh, Nov. 20, 1776. He settled in his native city as a bookseller in 1804, and soon added the trade of a publisher to his original business. The first number of Blackwood's Magazine appeared on the 1st of April, 1817, and from the first was conducted in the Tory interest. It was started just at the time when the general peace which had been established in Europe was beginning to reanimate the hopes of the Whigs, and when it was all the more necessary for the Tories to defend by the press that preponderance which they still held in Parliament. Mr. Blackwood was fortunate enough to secure as his coadjutors in his new literary undertaking most of the leading authors of the day belonging to the Tory party, among them Sir Walter Scott, John Gibson Lockhart, Hogg (the Ettrick Shepherd), Professor Wilson (Christopher North), De Quincey (the English Opium-eater), and others. All that was connected with the management of the magazine he took into his own hands, and he himself selected the articles for each number —a task for which he was admirably qualified, for although he wrote little himself, he was an admirable judge of literary works. The new magazine on its first appearance entered upon a campaign against the Edinburgh Review, combating both its political views and its literary decisions. From the first it attracted a great deal of attention, and its success was decided by the appearance of the Noctes Ambrosianæ, a series of articles in the form of dialogues, in which the current questions in politics and literature were discussed with the most pungent sarcasm and inexhaustible humour. The brilliant articles of Dr. Maginn added not a little to its reputation, and constantly, as the original contributors withdrew, new and valuable accessions were made to the staff of its supporters. Mr. Blackwood died Sept. 16, 1834, but his business has since been carried on by his sons, and the magazine, although it has perhaps lost a good deal of its former reputation, still keeps its place as one of our leading periodicals. Among the more recent contributors to it may be mentioned Bulwer-Lytton, Professor Aytoun, Lewes, the author of the Life of Goethe, and Miss Evans, better known by her pseudonym of George Eliot.

BLACKWOOD'S MAGAZINE. See BLACKWOOD (WILLIAM).

BLADDER, URINARY, a musculo-membranous bag or pouch destined to receive and retain for a time the urine which is secreted by the kidneys. It occupies the anterior and median portion of the pelvis, and in the male of the human subject is situated behind the pubis and above and in front of the rectum; in the female above and in front of the vagina and uterus. It is composed properly of three coats—an outer or cellular, a middle or muscular, and an inner or mucous—while the peritoneum also forms a coating over part of its external surface. The urine secreted by the kidneys is conveyed into

this reservoir by means of two tubes called the ureters, which open near the neck or lower part of the bladder in an oblique direction, by which means they prevent the reflux of the urine. When empty it forms a rounded, slightly conoid mass about the size of a small hen's egg. As it gradually fills with urine its walls become distended in all directions, except in front, and it then rises above the pelvis proper into the abdomen. It is held in its place by two lateral ligaments, one on each side, and an anterior ligament. The contents are carried off by the urethra, which, as well as the neck of the bladder, is surrounded by a substance called the prostate gland. The bladder is subject to many diseases, some of which are among the most painful to which man is subject. These arise sometimes from inflammation or organic disease of its coats, sometimes from calculous concretions, sometimes from disease of its excretory canal (the urethra), causing obstruction to the passage of its contents; and it is also subject to cancer, fungus, paralysis, &c. A urinary bladder is found in all the mammalia, and in some fishes, but not in birds or reptiles.

BLADENSBURG, a post-town in Prince George's county, Maryland, on the eastern branch of the Potomac, 6 miles N.E. Washington; lon. 76° 57′ W.; lat. 38° 56′ N. It contains about 100 houses. A battle was fought here August 24, 1814, between the British and Americans, in which the latter were defeated. This success of the British led the way to the conquest and burning of Washington.

BLAINVILLE, Henri Marie Ducrotay de, a celebrated French naturalist, born at Arques, near Dieppe, in 1777; after receiving his first education entered the military academy of Beaumont-en-Auge, and shortly after the breaking up of that establishment by the revolution entered the school of design at Rouen. Here he only remained for a short time, and repairing to Paris in 1796, with the view of devoting himself to the fine arts, became a pupil of the historical painter Vincent. Having been exempted from military service in consequence of an accident, he employed part of his leisure in attending lectures at the Museum of Natural History and the College of France. At this time G. Cuvier was the great attraction, and it is said that De Blainville, after hearing him on one occasion, quitted the amphitheatre with a determination to acquire distinction as a naturalist. Meantime he studied human anatomy, and obtained his degree of M.D. in 1808. Sometime after Cuvier became so strongly impressed with his talents that he invited him to concur with him in a work on human anatomy, on which he had been long engaged, but which he was not destined to publish. De Blainville accordingly took his place in the laboratory of the illustrious professor, and was chosen to assist him in his course at the College of France and at the Athenæum. Shortly after, when a vacancy took place in the chair of anatomy and zoology in the Faculty of Sciences at Paris, it was put up to competition through the influence of Cuvier, and gained by De Blainville by his thesis on the Ornithorhynchus delivered in 1812. Unfortunately misunderstandings soon arose between the master and his comparatively youthful rival, and ultimately terminated in an open rupture. The true causes are scarcely known, and as usually happens in such cases, neither party was free from blame; but the naturally intractable temper of De Blainville gives reason to suspect that the greater share of it must rest with him. On the occasion of the rupture he said to Cuvier, 'I shall one day sit at the Institute and the Museum of Natural History beside you, facing you, and in spite of you.' The expression was unjustifiably harsh, but the event so completely realized it that it looks almost like prophecy. In 1825 De Blainville was admitted to the Academy of Sciences as the successor of Lacépède, and on the death of Lamarck in 1829, the chair which he held in the Museum of Natural History having been divided, the department of mollusca, zoophytes, and worms was committed to De Blainville, whose important works on these groups made it impossible to confer it on any other. In 1832 he quitted this department to become the successor of Cuvier in the chair of comparative anatomy in the same establishment. Both the abundance and the ability of his labours prove him to have been not unworthy of the honour. Like Cuvier he devoted himself at once to anatomical researches and zoological studies, and from long and careful practice in comparing the types of the animal kingdom with each other, not only displayed great ability in fixing upon real affinities, but was able in this way to throw new light on many important facts which had been previously misunderstood, and were not even appreciated till long after he had explained them. As a classifier he has been thought to attach too much importance to external form, but it is impossible on merely reading his classification not to be struck with the originality, ingenuity, and thorough knowledge of the subject which it displays. His works, contained both in the more important collections of the period, and in separate treatises, are too numerous to be enumerated seriatim, but mention is especially due to L'Organisation des Animaux ou Principes d'Anatomie Comparée (1822); Manuel de Malacologie et de Conchyliologie avec Atlas de 100 planches (1825); Cours de Physiologie Générale (1829–32); Manuel d'Actinologie (1834); Sur les Principes de la Zooclassie (1847); and above all, the gigantic but unhappily unfinished work entitled Ostéographie ou Description Iconographique Comparée du Squelette et du Système Dentaire des Cinq Classes d'Animaux Vertébrés, Récents et Fossiles (1839–50). At this last date De Blainville had reached the advanced age of seventy-two, but his constitution showed no signs of decay, and he was in the midst of his labours when, without any previous warning, he was struck with apoplexy. He had entered a carriage, intending to spend a few days in the country, and when discovered was just expiring. He had not confined his attention to natural science, and it is said that he has left some interesting papers on several political and social questions.

BLAIR, Hugh, D.D., an eminent Scottish divine and cultivator of polite literature, was born at Edinburgh, April 7, 1718, and commenced his academic career at the university there in 1730. In 1741 he was licensed as a preacher, and the following year was ordained to the parish church of Colessie in Fife, but a few months after was elected to the second charge of the Canongate, Edinburgh. In 1754 he was called by the town-council of Edinburgh to accept of one of the city charges, that of Lady Yester's church, and in 1758 he was promoted by the same body to the highest situation attainable by a Scottish clergyman—one of the charges of the High Church. In 1759 he commenced, with the approbation of the university, a course of lectures to students upon the principles of literary composition; and in 1762 he was made professor of rhetoric and belles-lettres in the University of Edinburgh, being the first that ever occupied this chair. He continued to deliver his lectures annually till 1783, when he published them for the more extensive benefit of mankind. They are not by any means, nor were they ever pretended to be, a profound or original exposition of the laws of the belles-lettres. They are acknowledged to be a compilation from many different sources, and only designed to form a simple and intelligible code for

the instruction of youth in this department of knowledge. Regarded in this light they are entitled to very high praise, which has accordingly been liberally bestowed by the public. In 1763 he published a dissertation on the Poems of Ossian, in the authenticity of which he firmly believed.

It was not till 1777 that he could be prevailed upon to offer to the world any of those sermons with which he had so long delighted a private congregation. One of the sermons having been sent by Mr. Strahan, the king's printer, to Dr. Johnson for his opinion, Mr. Strahan received from him the following characteristic note: 'I have read over Dr. Blair's first sermon with more than approbation; to say it is good is to say too little.' Mr. Strahan thereupon agreed to purchase the volume, with Mr. Cadell, for £100. The sale was so rapid and extensive, and the approbation of the public so high, that, to their honour be it recorded, the proprietors made Dr. Blair a present, first of one sum, and afterwards of another, of £50, thus voluntarily doubling the stipulated price. The volume speedily fell under the attention of George III., and by a royal mandate to the exchequer in Scotland, dated July 25, 1780, a pension of £200 a year was bestowed on Dr. Blair. During the subsequent part of his life Dr. Blair published three other volumes of sermons; and it might safely be said that each successive publication only tended to deepen the impression produced by the first. He died on the 27th December, 1800.

BLAIR, JAMES, a divine, who was reared for the Episcopal Church of Scotland, at the time when it was struggling with popular dislike in the reign of Charles II. Discouraged by the equivocal situation of that establishment in Scotland, he voluntarily abandoned his preferments and removed to England, where he was patronized by Compton, bishop of London. By this prelate he was prevailed upon to go as a missionary to Virginia about 1685, and having given the greatest satisfaction by his zeal in the propagation of religion, he was, in 1689, preferred to the office of commissary to the bishop, which was the highest ecclesiastical dignity in that province. His exertions were by no means confined to his ordinary duties. Observing the disadvantage under which the province laboured through the want of seminaries for the education of a native clergy, he set about, and finally was able to accomplish, the honourable work of founding the College of Williamsburgh, which was afterwards, by his personal intervention, endowed by King William III. with a patent under the title of the William and Mary College. He died in 1743, after having been president of this institution for about fifty, and a minister of the gospel for above sixty years. He had also enjoyed the office of president of the Council of Virginia. In the year before his death he had published at London his great work, entitled, Our Saviour's Divine Sermon on the Mount Explained, and the Practice of it Recommended, in Divers Sermons and Discourses (four vols. 8vo).

BLAIR, JOHN, an eminent chronologist and geographer, a native of Scotland, which country he quitted for London about the middle of the last century. In 1754 the publication of a work in folio, entitled The Chronology and History of the World from the Creation to A.D. 1753, gained him great reputation. He dedicated his work to the Lord-chancellor Hardwicke, and in 1757 was appointed chaplain to the Princess-dowager of Wales, and mathematical tutor to the Duke of York, whom he accompanied, in 1763, on a tour to the Continent, having already received several ecclesiastical preferments. On his return to England he published, in 1768, a new edition of his Chronological Tables, with fourteen maps of ancient and modern geography annexed. He died June 24, 1782, of an attack of influenza.

BLAIR, ROBERT, author of The Grave, a poem, was the eldest son of the Rev. David Blair, one of the ministers of Edinburgh, and chaplain to the king. He was born in the year 1699, and after the usual preparatory studies, was ordained in 1731 minister of Athelstaneford, in East Lothian, where he spent the remainder of his life. Blair was at once a man of learning and of elegant taste and manners. He was a botanist and florist, and was also conversant in optical and microscopical knowledge, on which subjects he carried on a correspondence with some learned men in England. He was a man of sincere piety, and very assiduous in discharging the duties of his clerical functions. While still very young Blair wrote some verses to the memory of his future father-in-law, Mr. Law, who was also his blood-relation. His Grave was chiefly composed in that period of his life which preceded his ordination as a parochial clergyman. It was first printed in 1743, and is now esteemed as one of the standard classics of English poetical literature, in which rank it will probably remain longer than many works of greater contemporary or even present fame. Blair died in 1746. His fourth son, Robert, rose to be president of the Court of Session.

BLAIR-ATHOLE, a village, Scotland, county Perth, on a plain near the confluence of the Tilt and Garry, on the great Highland road from Perth to Inverness, 30 miles N.N.W. from Perth. It consists of a single row of ornamental cottages, and a commodious inn, erected by the Duke of Athole. At a short distance are the parish church and school, both plain but substantial buildings. At the distance of about a quarter of a mile is Blair House or Castle, the seat of the nobleman above named—a plain but beautifully situated building. There are here some larch-trees of enormous size, which derive no small interest from their being amongst the first planted in Scotland. Pop. in 1871, including Bridge-of-Tilt, 387.

BLAIRGOWRIE, a town in Perthshire. The town is finely situated on the water of Ericht, on the N. side of Strathmore. It is a prosperous place, and possesses considerable linen manufactures, and a number of spinning-mills. The streets are, in general, straight and well kept; the houses are of stone, and mostly well built. Besides the parish church there are several churches of other denominations. The purity of the air and the beauty of the scenery round Blairgowrie have rendered it a favourite summer resort. In the parish, which is 11 miles long and in some parts 8 broad, the Ericht makes some fine natural cascades; and there are several lakes and a chalybeate spring, formerly much resorted to. Several cairns and Druidical circles are found here. Pop. of town in 1871, 5252.

BLAKE, ROBERT, a celebrated British admiral, was the eldest son of a merchant in the Spanish trade, settled at Bridgewater, where Blake was born in 1599. After attending the grammar-school of his native place he was sent to Wadham College, Oxford, where he took the degree of B.A. in 1617. On his return to Bridgewater he lived for some time in a private manner on the fortune left him by his father, and was led, by the gravity of his own disposition and by his family connections, to embrace the principles of the Puritans, by whose interest he was elected member for Bridgewater in the Parliament of 1640. This being soon dissolved he lost his election for the next, and immediately sought to advance the cause in a military capacity in the war which then broke out between the king and Parliament. He soon distinguished himself by his activity. In 1649,

in the manner of those times, when military men often served on shipboard, he was sent to command the fleet in conjunction with Colonels Deane and Popham, and thus commenced the naval career which has given him so distinguished a place in British history. He immediately sailed to Kinsale in quest of Prince Rupert, whom he attempted to block up in that port. The prince, contriving to get his fleet out, escaped to Lisbon, where Blake followed him; and being refused permission to attack him in the Tagus by the King of Portugal, he took several rich prizes from the Portuguese (against whom the Parliament declared war), and followed Rupert to Malaga, where, without asking permission of Spain, he attacked him, and nearly destroyed the whole of his fleet. On his return to England he was made warden of the Cinque Ports, and soon after reduced the islands of Scilly and Guernsey. In 1652, on the prospect of a Dutch war, he was made sole admiral, and on the 19th of May was attacked in the Downs by Van Tromp with a fleet of forty-five sail, the force of Blake amounting only to twenty-three. He, however, fought so bravely that Van Tromp was obliged to retreat. He then continued his cruise, took a number of Dutch merchantmen, and after several partial actions, drove the enemy into their harbour and returned to the Downs. May 29 he was again attacked by Van Tromp, whose fleet was now increased to eighty sail. Blake, who could not bear the thought of a retreat, engaged this vast force with a very inferior number and an unfavourable wind; but, after every possible exertion, was obliged to retreat into the Thames, on which Van Tromp was so much elated that he sailed through the Channel with a broom at his mast-head, to signify that he had swept the sea of British ships. In the February following Blake, having with great diligence repaired his fleet, put to sea with sixty sail, and soon after met the Dutch admiral, who had seventy sail and 300 merchantmen under convoy. During three days a furious running fight up the Channel was maintained with obstinate valour on both sides, the result of which was the loss of eleven men-of-war and thirty merchant ships by the Dutch, while that of the English was only one man-of-war. It was in April of this year that Cromwell assumed the sovereignty, on which occasion Blake and his brother admirals issued a declaration that, notwithstanding this change, they resolved to persist in faithfully performing their duty to the nation. 'It is not for us,' said Blake to his officers, 'to mind state affairs, but to keep the foreigners from fooling us.' June 3 he again engaged Van Tromp with dubious success; but renewing the action the next day, he forced the Dutch to retire with a considerable loss in ships and men into their own harbours. On his return he was received by Cromwell with great respect, and returned member in the new Parliament for Bridgewater. Aware of his affection for a republican government, the Protector was not displeased at having occasion to send him, with a strong fleet, to enforce a due respect to the British flag in the Mediterranean. He sailed first to Algiers, which submitted, and then demolished the castles of Goletta and Porto Ferino, at Tunis, because the dey refused to deliver up the British captives. A squadron of his ships also blocked up Cadiz, and intercepted a Spanish Plate fleet. Being now very sick, he resolved to do one more service to his country before his death, and sailed with twenty-four ships to Santa Cruz, in Teneriffe; and notwithstanding the strength of the place, burned the ships of another Spanish Plate fleet which had taken shelter there, and by a fortunate change of wind came out without loss. His brother having failed in some part of duty during this service, he immediately removed him from his command. Finding his disorder making rapid progress he then sailed for England, and amidst his frequent inquiries for the sight of the English coast, expired while the fleet was entering Plymouth Sound, August 17, 1657. His body was honoured with a magnificent public funeral, and interred in Westminster Abbey, whence it was, with pitiful spite, removed at the Restoration and buried in St. Margaret's Churchyard. The foregoing detail sufficiently evinces the bravery and talents of this able commander, who first deviated from the old practice of keeping ships and men as much out of danger as possible, and gave the example of bold and spirited achievement. So disinterested was he that, after all his rich captures and high posts, he scarcely left behind him £500 of acquired property, freely sharing all with his friends and seamen, into whom he infused that intrepidity and spirit of enterprise by which the British navy has been ever since so highly distinguished.

BLAKE, WILLIAM, son of a London hosier, was born in 1757, and having early manifested a particular turn for drawing, was apprenticed to an engraver at the age of fourteen. He did not, however, confine his attention to this art, but divided his time between it and poetry, for his destiny was, he expressed it, 'not to gather gold, but to make glorious shapes, expressing godlike sentiments.' His eccentricities were so numerous that it is impossible to believe he was perfectly sane, and yet both his designs and his poems contain extraordinary beauties. Among the former are designs for Blair's Grave, and twenty-one illustrations to the Book of Job; and among the latter, Songs of Innocence and of Experience, illustrated with sixty-five etchings. An elegant edition of these songs was published by Pickering in 1839. Blake died in 1828.

BLAKELEY, JOHNSTON, a captain in the American navy during the war of 1812–15, was born in Ireland in Oct. 1781. Two years after, his father, Mr. John Blakeley, emigrated to the United States, and settled in Wilmington, North Carolina. In 1800 he obtained a midshipman's warrant, and in 1813 was made a master commandant, and soon after appointed to the command of the *Wasp*. In this vessel he fell in with the British man-of-war *Reindeer*, in lat. 48° 36′, which he took after a short action. The *Reindeer* was cut to pieces in such a manner as to render it impossible to save her; and she was accordingly set on fire. After this the *Wasp* put into L'Orient, from which port she sailed Aug. 27, and four days afterwards, falling in with ten sail of merchantmen, under convoy of a ship of the line, he succeeded in cutting off one of the vessels. On the 1st September, 1814, she fell in with four sail, two on each bow, but at considerable distances from each other. The first was the brig-of-war *Avon*, which struck after a severe action; but Captain Blakeley could not take possession, as another enemy was approaching. This vessel, it seems, however, was called off to the assistance of the *Avon*, which was now sinking. It was reported that the *Wasp* was sunk by the first broadside; but she was afterwards spoken by a vessel off the Western Isles. After this we hear of her no more.

BLANC, MONT. See MONT BLANC.

BLANCHARD, FRANÇOIS (by some called JEAN PIERRE), one of the first aëronauts, born at Andelys, in the department of the Eure, in 1738 (or according to others in 1753), was fond of mechanics from his youth, and in his sixteenth year invented a self-moving carriage, in which he rode a distance of 18 miles. This invention, which he improved in 1778, recommended him to the court of Versailles. He displayed equal ingenuity by the invention of a

hydraulic machine, in the nineteenth year of his age, and afterwards in the construction of a flying ship, which, by means of a counterpoise of 6 pounds, was raised to more than 20 feet from the ground. He eagerly availed himself of the discoveries of the brothers Montgolfier, and the improvements of the same by Professor Charles and M. Robert in Paris. After having made his first aërostatic voyage, March 4, 1784, he crossed the Channel from Dover to Calais, 1785, with Dr. Jeffries, a gentleman of Boston, in the United States. For this exploit he was rewarded by the King of France with a present of 12,000 francs and a pension of 1200. In the same year, at London, he first made use of a parachute invented by him, or, according to others, by Etienne Montgolfier. After having performed many aërostatic voyages in foreign countries also, he was accused of propagating revolutionary principles, and imprisoned, 1793, in the fortress of Kufstein, in the Tyrol. Having obtained his liberty, he made his forty-sixth ascent in the city of New York, 1796. In 1798 he ascended with sixteen persons in a large balloon at Rouen, and descended at a place 15 miles distant. In 1807 his aërostatic voyages amounted to more than sixty-six. He died in 1809.—Madame Blanchard continued to make aërial voyages. In 1811 she ascended in Rome, and after going a distance of 60 miles, she rose again to proceed to Naples. In June, 1819, having ascended from Tivoli, in Paris, her balloon took fire at a considerable height, owing to some fire-works which she carried with her. The gondola fell down in the Rue de Provence, and the hapless aëronaut was dashed to pieces.

BLANCHARD, JACQUES, a painter, born in Paris in 1600, received the first lessons of his art from Bellori, his maternal uncle, studied some time at Lyon, and in 1624 repaired to Rome. After two years he visited Venice, studied the works of Titian and the other great colourists of his school, and executed several paintings which gave him a name. After his return to Paris he executed a great number of works, which procured him the surname of the French Titian. His best piece, a Descent of the Holy Spirit, is in the cathedral of Nôtre Dame. He was cut off by consumption in 1638, when only in his thirty-ninth year.

BLANCHARD, LAMAN, a writer of some eminence, born at Great Yarmouth in 1803, commenced life as reader in a printing-office in London, became secretary to the Zoological Society in 1827, and in 1828 made his first appearance as an author by the publication of a volume of poetry, entitled Lyrical Offerings. In 1831 he became editor of the Monthly Magazine, and was afterwards connected with several magazines and newspapers. He was remarkable for the kindliness of his nature and the readiness of his pen, which, though often employed on subjects which gave scope for wit and sarcasm, was never dipped in gall. The death of his wife affected him so deeply that he became subject to great depression of spirits, and in a moment of temporary insanity he unhappily terminated his own life, in 1845.

BLANCHE, the name of several female personages who make a distinguished figure in history.—1. BLANCHE OF CASTILE, daughter of Alphonso IX., queen of Louis VIII., king of France, and mother of St. Louis. On the death of Louis VIII. she anticipated the formal appointment of a regency by procuring the immediate coronation of her son, and during his minority held the reins of government in his name with distinguished ability and success. In 1244, when St. Louis took his departure for the Holy Land, she again became regent, and gave new proofs of her talents and virtues. Her days are said to have been shortened by the long absence of her son, and a prevailing rumour that he had resolved to remain permanently in Palestine. She died at Melun in 1252 or 1253.——2. BLANCHE, daughter of Peter, duke of Bourbon, in 1353, when fifteen years of age, married Peter, king of Castile, surnamed the Cruel. Don Frederick, Peter's natural brother, had been deputed to meet her at Narbonne, and bring her into Spain, and she is said to have so far forgotten herself as to conceive a violent passion for him. Rumours to this effect had reached the king's ears, and though he celebrated the marriage, he soon showed that he had placed his affections elsewhere. He shortly after declared the marriage null, imprisoned the queen in the castle of Medina Sidonia, and is said to have soon after got rid of her by poison.

BLANCO, CAPE (literally, *white cape*), a name given to a great number of capes by the Spaniards, Portuguese, and Italians. It corresponds to the French *cap blanc*. The name is as common and as unphilosophical as that of White Hill, Black River, &c.

BLANDFORD FORUM, a municipal borough and parish, England, county Dorset. The town is 14 miles N.E. from Dorchester, beautifully situate on a bend of the Stow, across which are three bridges, one of them having six arches. It has regularly laid out, well paved and lighted streets; a town-hall and exchange, neat and commodious buildings; the church, situated in the centre of the town, an elegant modern structure in the Grecian style, with a tower and spire; a free grammar-school, and other schools; alms-houses and other charities. Blandford is a borough by prescription; and a charter of incorporation was granted by James I. It gives the title of Marquis to the Duke of Marlborough. Pop. of borough in 1871, 1536.

BLANK VERSE, verse without rhyme. This was the invariable form of the poetry of the ancients, but it is now peculiar to the Italian, English, and German languages. The poetry of the Anglo-Saxons and the earliest English poetry was not rhymed, yet it is not generally called blank verse, as their versification had a peculiarity of its own called alliteration (which see). When rhyme, however, was once introduced into English verse, it was for a long time regarded as the exclusive form of versification, and the Earl of Surrey, who was beheaded by order of Henry VIII. in 1547, is said to have been the first to use blank verse in England, namely, in his translation of the second and fourth books of Virgil's Æneid. The most common form of blank verse in English poetry is the decasyllabic, such as that of Milton's Paradise Lost and the dramas of Shakspeare. From Shakspeare's time it has been the kind of verse almost universally used by dramatic writers. Dryden, indeed, after the Restoration, introduced rhyme into his tragedies, in imitation of the French rhymed plays; but after keeping the stage for a number of years, they became intolerable to the English ear, and the introduction of rhyme into the drama has never since been attempted in England. Shakspeare not uncommonly ends a scene with a few lines of rhyme, although the rest of the scene is in blank verse, and in the subordinate play interwoven with the action of Hamlet blank verse is used throughout. The first use of the term blank verse is said to be in Hamlet, ii. 2: 'The lady shall say her mind freely, or the blank verse shall halt for't.'

BLANTYRE, a parish and village in the middle ward of Lanarkshire. The parish, which is about 6 miles in length and 1 in breadth, is fertile, except towards the S., where it becomes a deep peat-moss. The largest village in the parish is Blantyre Works on the

Clyde, opposite Bothwell, where cotton-spinning, cotton-weaving, and Turkey-red dyeing are very extensively carried on. On the top of a rock, which rises perpendicularly from the Clyde, opposite the noble ruins of Bothwell Castle, are the ruins of the priory of Blantyre, founded before 1296. Urns have been dug up at different times in various parts of this parish.—The village of Blantyre, or Kirktown of Blantyre, stands 1½ miles from the Clyde; its pop. in 1871 was 1393; that of Blantyre Works, 1304; of the parish, 3472.

BLARNEY, a village, Ireland, in the county of Cork, and 4 miles N.W. of the city of Cork, on a rivulet of same name, here crossed by a handsome bridge of three arches. It is small, but well built; and besides the parish church, contains a National school and dispensary. Flax and cotton were formerly manufactured to some extent, but both of these branches have now decayed. Spinning and dyeing woollen yarn is, however, still carried on; and there is an extensive paper-mill, employing about 170 hands. Blarney Castle stands on an isolated limestone rock, at the junction of the Blarney and Comane; erected in the fifteenth century, and the scene of several interesting historical events; but deriving its chief notoriety from a stone in its N.E. angle, about 20 feet from the top, bearing a Latin inscription, recording the date of the erection, and called the 'Blarney Stone,' to which tradition ascribes the faculty of communicating to all who kiss it that species of most persuasive fluency of speech commonly called *blarney*. The groves of Blarney are extensive and interesting, and beneath the castle there are also some curious natural caves. The Dublin and Cork Railway passes close to the village.

BLASIUS, St., Bishop of Sebaste, in Armenia, is said to have suffered martyrdom about 316, by order of Agricola, governor of Cappadocia and Little Armenia. His works, written in Greek, and translated by Godiscard, are of little value; but his bones, which were brought from the East during the Crusades, became celebrated, and obtained the credit of performing several miraculous cures. He is the patron saint of Ragusa, and holds a place both in the Latin and Greek calendars.

BLASPHEMY is somewhat variously defined. According to the more general definition, it means the denying of the existence of God; assigning to him false attributes, or denying his true attributes; speaking irreverently of the mysteries of religion; and formerly, in Catholic countries, it also included the speaking contemptuously or disrespectfully of the Holy Virgin or the saints. Public blasphemy has been considered by the Church of Rome as an unpardonable sin, and it was formerly punished with death by the municipal laws. The seventy-seventh novel of Justinian assigned this punishment to it; and the capitularies inflicted the same punishment upon such as, knowing of an act of blasphemy, did not denounce the offender. The former laws of France punished this crime with fine, corporal punishment, the gallows, and death, according to the degree and aggravation of the offence. The records of the parliaments supply numerous instances of condemnation for this crime, and many of punishment by death; others of branding and mutilation. A man was for this offence condemned to be hanged, and to have his tongue afterwards cut out, and the sentence was executed at Orleans as late as 1748. But it is remarked by a writer in the French Encyclopédie Moderne, that we should form an erroneous opinion from the present state of society of the effect of this offence, and the disorders it might introduce in former times; for religion was once so intimately blended with the government and laws, that to treat the received articles of faith or religious ceremonies with disrespect, was in effect to attack civil institutions.

By the law of Scotland, as it originally stood, the punishment of blasphemy was death. Blasphemy consisted of railing at or cursing God, or of obstinately persisting in denying the existence of the Supreme Being, or any of the persons of the Trinity. The last individual who suffered the extreme penalty of this law in Scotland was a young man, aged twenty, the son of a surgeon in Edinburgh. His name was Thomas Aikenhead, and his trial and execution took place so late as the end of the seventeenth century. Among other accusations the indictment stated, that he ridiculed the Holy Scriptures; that he rejected the mystery of the Trinity; that he maintained that God, the world, and nature, were all one thing, and that the world existed from all eternity; that he said the inventors of the scriptural doctrines would be damned, if there was such a thing as rewards or punishments after this life. A number of other articles are contained in the indictment, but it seems unnecessary to specify them, as they amount rather to a kind of profane talk, than to specific charges of what is usually deemed blasphemy. No defence appears to have been made for the prisoner, nor were the major counts in the indictment, which, according to the statute, forfeited life, properly proved; yet the unhappy young man was found guilty, and on the 8th of Jan. 1697, he was executed, his body buried under the gallows, and his movable estate forfeited. See Hugo Arnot's Collection of Criminal Trials.

By the common law of England blasphemies of God, as denying his being and providence, all contumelious reproaches of Jesus Christ, &c., are punishable by fine and imprisonment, or corporal punishment; and by the statute of 9 and 10 William III. cap. xxxii., if any one shall *deny either of the persons of the Trinity to be God, or* assert that there are more gods than one, he shall be incapable of holding any office; and for a second offence be disabled from suing any action, or being an executor, and suffer three years' imprisonment. By the statute of 53 George III. cap. clx., the words in italics were omitted. This law was an infringement of the liberty of conscience, and certainly could not now be practically enforced in England, since some of the doctrines of some sects of Christians, openly and habitually inculcated in their public assemblies, would be violations of it. This was no doubt the reason of omitting the part of the statute above referred to. The early legislation of the American colonies followed that of the mother country, and in some of them the crime of blasphemy was punished with death; but the penalty was mitigated before the establishment of the independence of the States, and imprisonment, whipping, setting on the gallows or in the pillory, having the tongue bored with a red-hot iron, &c., were substituted. The statutory provisions of the different states on this subject are very various. In some of them the offence of blasphemy is distinguished from that of profane swearing; in others, blasphemy is not mentioned as a distinct offence. Several penalties against blasphemy are to be found in the laws of some of the New England states; according to which it is provided that, if any persons shall blaspheme, by denying, cursing, or contumeliously reproaching God, his creation, government, or final judging of the world, or by cursing or reproaching Jesus Christ or the Holy Ghost, or contumeliously reproaching the Word of God, consisting of the commonly received books of the Old and New Testament, he is liable to imprisonment for a term not exceeding five years. But the most direct and public violations of these laws are passed over without punishment or

prosecution. In many, and we believe the greater number of the states, the offence of blasphemy, not being a subject of special statutory provision, is only punishable either as an offence at common law, or a violation of the statute laws against profane swearing.

BLAST-FURNACE. See IRON.

BLASTING, the technical term for splitting and breaking up any object by means of gunpowder. The operation, which is of extensive use in quarrying, mining, and generally in all branches of engineering, is performed by boring a hole in the substance to be exploded, by means of an iron rod, called a *jumper*, filling it with gunpowder, and igniting it by means of a match, burning so slowly as to allow the parties employed to remove to a sufficient distance before the explosion takes place. At one time it was supposed that the force of the explosion depended on the firm packing of the gunpowder in the hole by means of small chips of stone, sand, &c. In this operation the gunpowder was sometimes accidentally ignited, and frightful accidents took place. It has since been ascertained that loose sand is as effectual as firm packing, which in consequence has been generally laid aside. One of the most important modern improvements in blasting, is the firing of the charge by galvanism. This mode is more especially applicable to submarine blasting, and was first practised for that purpose by General Pasley, in 1839. The only thing necessary is to make an interruption in the conducting wire at the point where the explosion is to take place. In passing the electric current, a spark produced at the interruption fires the charge. The effect being instantaneous the operator can fire any number of charges simultaneously. Gun-cotton is often employed in blasting, and nitro-glycerine has also been found to be a very powerful agent in such operations, but its use requires the utmost caution, as it is very liable to explode unexpectedly with most disastrous results. The same objection does not apply to dynamite (which see), a mixture of nitro-glycerine with sand, which is quite as effective and perfectly harmless, except when ignited by a fuse.

BLAZONING, or BLAZONRY. See HERALDRY.

BLEACHING is the art of whitening linen, wool, cotton, silk, wax, also the materials of which paper is made, and other things. It is shown by experience that organic bodies, after being deprived of life, and becoming solid and dry, lose their colour and become white, by the influence of the air and the sunbeams. Upon this fact the manner of bleaching which was formerly in use is grounded:—namely, boiling the goods alternately in alkali and soap, scouring, and then exposing them to the air and sunshine, termed crofting. Under this tedious system light fabrics required from six to eight weeks for their completion, while heavy goods often took the whole summer.

The use of chlorine as a bleaching agent was first proposed by Berthollet in 1786, and shortly afterwards introduced into this country, where it was first used simply dissolved in water, afterwards dissolved in alkali, and then in the form of bleaching-powder, commonly called chloride of lime, the manufacture of which was patented by Mr. Tennant of St. Rollox, Glasgow, in 1799. The patentee made some improvements on the original process, by which he was enabled to double the proportion of chlorine, the only bleaching principle which the powder contains. The firm with which Mr. Tennant was connected still continues to be the most extensive manufacturers of this article in Great Britain.

The average quantity of chlorine which bleaching-powder now contains is one-third of the gross weight of the powder. In the bleaching of cotton cloth, the pieces, after being singed, by passing them over a red-hot plate, or a semi-cylinder of iron or copper, are steeped in lukewarm water, or old lyes, until they are completely soaked, which loosens any paste or filth got during weaving; they are then well washed through the dash-wheel, and put through the hydro-extractor or drying machine. If the cotton is in the hank, this process of steeping and washing is not required.

The mechanical operations of the bleaching-house vary considerably, according to the quality of the goods and the facility for mechanical appliances. In the chemical operations of whitening the cloth there is little variation, further than that heavy fabrics require longer time and more frequent repetition of the processes. The first operation, after steeping and washing, is boiling. The boiling liquor is made by adding a quantity of water to slaked lime, and when the grosser particles of the lime have settled to the bottom of the vessel, the milky liquor is put into the boiler, or it may be filtered through a cloth. Some bleachers use along with the lime a little carbonate of soda; the quantity of lime varies from 4 lbs. to 8 lbs. for every 100 lbs. of cotton, and from 1 lb. to 2 lbs. of soda-ash, where this is used. The boilers used for boiling are those aptly termed *vomiting* boilers, because the boiling liquid is made to shower over the goods and percolate down through them. This is effected by having a false bottom or frame fitted inside the boiler at about one-third of its depth from the bottom, upon which the goods are laid. The space between the false bottom and real bottom of the boiler is filled with the liquor or lye, connected with which is a pipe leading to the top of the boiler. When the heat is applied, either by steam or fire, and the liquor begins to boil, it is forced up through this pipe, which is made to shower its contents over the surface of the goods. This boiling is continued, according to the quality of the goods, from six to twelve hours.

The goods are now removed from the boiler and washed in water; if yarn, they are hand-washed, and dried by the hydro-extractor; and if cloth, they are washed by the dash-wheels, put through the extractors, and then laid into the bleaching liquor, which is contained in a large stone or wooden trough or cistern.

The bleaching solution is prepared by first dissolving a quantity of bleaching-powder in water, in a large cask, and allowing the whole to settle; a quantity of the clear liquor is then drawn from the cask, and put into the large bleaching cisterns, which have been previously nearly filled with water. To ascertain the necessary quantity of this strong bleaching liquor to be added to the troughs or cisterns, a certain measure of sulphate of indigo is taken in a graduated vessel, termed a test-glass, and then, according to the number of graduated measures of the bleaching solution required to decolour the sulphate of indigo, the strength of the bleaching liquor is regulated. These test-glasses and sulphate of indigo are carefully prepared for the purpose.

Instead of dash-wheels, a more improved method of cleaning and washing is adopted by some bleachers previous to boiling the goods. They are all sewed together, end to end, making one line of the whole. This line of pieces is drawn along by machinery between rollers and squeezers, with a plentiful supply of water, and having been thus thoroughly washed and cleaned, is at last laid out, by a mechanical contrivance, into the bleaching trough. The goods are allowed to steep in the bleaching liquor from six to eight hours, and are then lifted and washed, either by the dash-wheel or rollers, as before, and are then laid in a sour, made by adding about one pint of hydrochloric acid to every four gallons of water; some use a sour made of sulphuric acid. After

steeping in the sour for four hours, the goods are again washed, as before, and are subjected to another boiling for eight hours; but this time the lye is caustic soda or potash, generally the former, which is made caustic by boiling together a quantity of soda-ash and slaked lime, and allowing the sediment to settle, and using only the clear solution. About 8 lbs of soda-ash suffice for 100 lbs. of goods. After the boiling, the goods are again washed and steeped in the bleaching liquor for eight hours, and again washed and soured—the sour in this case being always made with sulphuric acid. Light fabrics require no further treatment; but heavy fabrics need a clearing process, which is a repetition of the last course, the liquors being generally, however, a little weaker, and the processes shorter. Cotton, in the hank, undergoes the same operations, except in the washings, which are performed by hand, not with the wheel. The goods being bleached and dried by the extractor, are now prepared for the operations of finishing. For this purpose they are stretched by women to their breadth, and the folds, as much as possible, taken out by beating them; then they are stitched together by the ends with a sailor's needle, and being thus prepared for the mangle the cloth is now starched, common wheat flour and a portion of porcelain clay being employed. It is then subjected to the action of the stiffening machine, and having been thus impregnated with starch, the superfluous portion of which is pressed out as it passes through the rollers above, the goods are then hung upon rails in an apartment called the stove, heated by two furnaces, from which flues are led through the room. The heat thus generated is sometimes so great that the workmen, in hanging up the cloth, are obliged to throw off the most of their clothes. When the goods are dried thoroughly, they are taken from the stove and carried to the damping machine, where they are subjected to the action of a shower of water. When the cloth comes from the damping machine, it may be seen covered with wet spots, the greater portion, however, being dry; but after remaining some time it becomes uniformly damp. The goods are now passed through the calender; they are then regularly folded and put into a Bramah press, with a sheet of pasteboard between each, and, being sufficiently pressed, they are then finished for the market.

The bleaching of linen is conducted after a similar manner as that of cotton; but there is much more colouring matter in the former than in the latter, and it is therefore found necessary in the bleaching of linen to repeat the boiling in lye, and the steeping in chloride of lime, three or four times. Some eminent linen bleachers, however, instead of repeating these operations so often, prefer an occasional exposure in the fields to the air and sunshine; indeed, consider that a portion of crofting cannot be altogether judiciously dispensed with.

The mode of bleaching woollen cloth in Paris is as follows:—The cloth being washed thoroughly in river water, and then hung upon poles, is, when half dry, stretched out in a very close stove, in which sulphur is burning. The vapour of the latter, diffusing itself by degrees, adheres to the whole of the cloth, by which it is rendered of a beautiful white.

For bleaching silk the usual method is this:—The raw material is put into a bag of fine linen, and thrown into a vessel of boiling river water, in which a quantity of good soap has been dissolved. In this the silk is boiled for three hours, the bag being then taken out and washed in cold water. This removes the natural gummy matter which the silk contains. It is then boiled in soap and water, a little indigo being added to the solution, giving it a bluish tinge, and being then taken out, wrung, and beaten, it is introduced into a stove, and subjected to the fumes of burning sulphur, in the same manner as woollen cloth. The white that is produced by sulphurous acid is never so permanent as that produced by chlorine. Scouring and washing of white woollen and silk affect the purity of the white, as may be daily observed in domestic use.

BLEACHING POWDER. See CHLORINE.

BLECHNUM, a genus of plants, belonging to the natural order Filices or ferns, sub-order Polypodieæ. It has been found in North Africa and North America, occurs in every European list of plants, and is very common throughout Great Britain, though only in the single species of *Blechnum boreale*, or hard fern.

BLEMMYES, or BLEMYES, a fabulous people of Ethiopia, without heads, their eyes, mouths, &c., being placed in their breasts. A barbarous tribe of this name appeared in the third century as the ally of the Egyptians against Diocletian. With a view of opposing to the Blemmyes a suitable adversary, Diocletian persuaded the Nobatæ, a people of Nubia, to remove from their ancient habitations in the deserts of Libya, and resigned to them an extensive but unprofitable territory above Syene and the cataracts of the Nile.

BLENDE. See ZINC.

BLENHEIM, or BLINDHEIM, a village situated in the circle of the Upper Danube, in Bavaria, on the Danube. Here was fought, August 13, 1704, the famous battle of Blenheim (or, as it is more commonly called on the European continent, the battle of *Höchstädt*, from another village of this name in the vicinity), in which Marlborough and Prince Eugene, commanding the allied forces of England and the German Empire, gained a brilliant victory over the French and Bavarians. The latter armies were drawn into the engagement under the most unfavourable circumstances. Both these armies were posted, under the command of Tallard, Marsin, and the Elector of Bavaria himself, between the village of Blenheim and that of Kinzingen, behind the Nebelbach, a small stream emptying into the Danube, which was on their right flank. They amounted to 56,000 men, whilst the forces of Marlborough and Eugene were about 52,000. The first had thrown their troops chiefly into the two villages, which they considered as points of support for their wings, though they were at too great a distance in front of their main position. A large proportion of cavalry was in the centre, since each army, the Bavarian as well as the French, had their horse on their wings, and in this way those of two wings must necessarily join each other. Both the commanders would undoubtedly have perceived and corrected this mistake, as Tallard had in Blenheim alone twenty-seven battalions of infantry; but they expected so little to be attacked, that when the line of the allies began to move, August 13, at two o'clock in the morning, they supposed them to be marching off. The greatest part of their cavalry was sent to forage. Even at seven o'clock, when the heads of the eight columns with which Eugene and Marlborough advanced towards the Nebelbach were to be seen, Tallard thought the whole a stratagem intended to cover the retreat; but he soon saw his error. The dispersed troops were recalled in the greatest hurry, and the cannon were drawn up in line. The French and Bavarians made every exertion to prevent the passage of the enemy over the Nebelbach, and the capture of the two villages, the conquest of which was considered, by Marlborough and Eugene, as decisive. Their line of attack was uncommonly long, about 4½ miles. Marlborough, in order to secure his right wing, attacked

Blenheim, but without success: he then changed his plan, and threw himself, with his principal forces, into the wide interval between the right wing and the centre of the enemy, leaving only as many troops before Blenheim as were necessary to check the body which occupied this position. At five o'clock in the afternoon he succeeded, after great efforts, in passing the Nebelbach, by which his victory was decided. Tallard himself was among the prisoners; his son was killed. The consequences of the battle were decisive. Bavaria, as Marlborough had anticipated, fell into the power of Austria. Fortune deserted Louis XIV., as it did Napoleon after the battle of Leipzig, and though he was able to continue the war for almost ten years longer, it was owing to the dissensions among the allies themselves, who contended about the best use of the victory till the opportunity to use it was lost.

BLENHEIM, the name of the demesne bestowed by national gratitude on the Duke of Marlborough, is situated in the parish of Woodstock, and county of Oxford. The estate of Woodstock, which had for many centuries belonged to the crown, having been conferred by Queen Anne on that great commander for his eminent services, Parliament granted the sum of half a million sterling to erect a suitable family seat. The building was intrusted to Sir John Vanbrugh, and called Blenheim, from the village where the duke gained his great victory. The grand sergeantry by which the manor is held, consists in the presentation at Windsor Castle on each anniversary of that event, by the Duke of Marlborough and his descendants, of a flag embroidered with *fleurs-de-lis*. In this park once stood the royal palace of Woodstock, where Alfred is said to have resided, and which was the favourite residence of Henry II., who erected a house in the park for his favourite mistress, Rosamond Clifford, whence the well-known legend of Woodstock-bower, Queen Eleanor, and the Fair Rosamond. Here the same monarch received the homage of Malcolm, king of Scotland, and Rhys, prince of Wales. Edward III. was also much attached to this palace, in which his eldest son, the illustrious Black Prince, was born, as well as his youngest son, Thomas, duke of Gloucester, usually called Thomas of Woodstock, from that event. Richard II. likewise kept his court here, at which time the poet Chaucer resided at Woodstock, in a house which stood near the present entrance to the park. When alarmed by the conspiracy of Sir Thomas Wyat, Queen Mary placed her sister the princess, afterwards Queen Elizabeth, in the palace at Woodstock, under the superintendence of Sir Henry Bedenfield. During the civil wars of the seventeenth century it was for some time defended for the king; but it ultimately surrendered, and was much injured and dilapidated by the Parliamentarians. The gate-house remained, and was tenanted so late as the reign of William III., and existed until the commencement of the last century, when the whole was removed.

The usual approach from Blenheim to Woodstock is through a triumphal arch or portal, from which the advance to the mansion is very fine. In front of the building stands a sculptured column 130 feet high, surmounted by a statue of the duke, whose victories and achievements are recorded on tablets round the base. The front of the house measures 348 feet from wing to wing, and although architectural critics find many faults in detail, the general effect is in the highest degree noble and commanding. The interior is also extremely magnificent; the hall, which is supported by Corinthian pillars, is 67 feet high; and the ceiling was painted by Sir James Thornhill, the design representing Victory crowning the duke. The gallery and bow-window room abound in portraits by the most eminent masters, both foreign and English. On the tapestry of the latter are figured the various battles gained by the same great general, and more especially that of Blenheim. The saloon is a noble and spacious apartment, which communicates with the hall, and occupies the entire breadth of the centre. The lower part is lined with marble, and six of its compartments are decorated with pictures by La Guerre, representing the inhabitants of the different nations of the world in appropriate costume. On the ceiling is a representation by the same artist, of the victorious duke arrested in his career by Peace and Time. The remaining principal subjects of admiration are the library, the theatre, the state drawing-room, the blue and green drawing-room, the grand cabinet, the dining-room, and the dressing-room, a description of the contents of which, including pictures, statues, grand articles of vertu, and splendid furniture, would occupy a volume. In the chapel, which forms one of the wings, is a fine marble monument by Rysbrack, to the great duke and his almost equally celebrated duchess, Sarah. The gardens and grounds, which are exceedingly spacious, were laid out by Brown, who contrived to make a most admirable use of the small river Glyme in the formation of a lake, or piece of water, which is justly deemed one of the greatest beauties of the place. It is crossed by several arches, and at the middle or grand approach is a magnificent bridge, the span of the centre arch of which is 101 feet.

BLESSING, or BENEDICTION. The expression of wishing one well soon gave rise, in early ages, to a solemn act, accompanied, like other solemnities of those periods, by symbolic signs; this was the *blessing* or *benediction*. In the patriarchal times, when the authority of the head of a family included that of the priest and the civil ruler, the blessing of course appertained chiefly to him, on account of his venerable character, and when the priests began to form a separate class, became, in certain cases, a prerogative of theirs. As the authority of the father, in the infancy of every nation, is extremely great, the idea soon sprung up that his prayers, invoking the favour of the Deity, were more effectual than those of others, and that whatever he blessed would be likely to receive the favour of God. The same importance was soon attributed to blessings conferred by a priest. The heathens, the Jews, and many Christian sects, have cherished this idea. By the Jewish institutions, certain benedictions were reserved to the priest: the same is the case in the Romish Church, in which different benedictions are appropriated to different degrees of the clergy. We shall mention only a few of them. The Catholic bishops alone can confer those benedictions which are connected with unction, and are called *consecrations*, as, for instance, the consecration of kings and queens, of the cup and *patera*, the church and altar. To them also is confined the benediction of abbots and abbesses, of knights, and the holy oil. For the benediction of the holy vestments, &c., they may employ a substitute. Every Catholic clergyman may confer the benediction on the occasion of betrothment; also the marriage benediction; may bless the fruits of the earth, and the holy water. The benediction of a bishop is eagerly sought for by a faithful Catholic, as contributing peculiarly to his spiritual welfare; and the Catholic clergy, in general, use the benediction as a salutation, or reward for a service, &c. When the pope rides or walks out, the Catholics kneel to receive his blessing, which he gives by a motion of his hand. In his ante-chamber are often seen things of different kinds, rosaries, &c., in large quantities, which he blesses in passing by. The Catholic Church blesses things animate and inani-

mate, and this is believed by many to preserve them from sickness, injury, &c. (See AGNES, ST.) Among several Protestant sects the benediction, at the close of the sermon, is in the form given by Moses. This is the case with the Lutherans. Catholics in many cases use the consecrated water in giving the benediction.

BLESSINGTON, MARGARET, COUNTESS OF, was born at Knockbrit, near Clonmel, Ireland, on 1st Sept. 1789. She was the third daughter of Mr. Edmund Power, an improvident man of good family, and at the age of fifteen was married to a Captain Farmer, but the union was a very unhappy one. He died in 1817, and a few months after his death, his widow married Charles John Gardiner, earl of Blessington. In 1822 they went abroad together, and continued to reside on the Continent till the earl's death at Paris in 1829. On that event taking place, Lady Blessington returned to London, and took up her abode in Gore House, Kensington, which had been bequeathed to her by her husband. Here for many years she held those celebrated reunions and soirees, at which the most distinguished literary characters in London were wont to assemble. The fascination of her manners and conversation, with her genial warm-heartedness of character, rendered these gatherings most attractive; but certain equivocal circumstances in relation to her connection with a Count d'Orsay prevented their being frequented much by respectable female society. The count had married a daughter of Lord Blessington by his first wife, and been separated from her shortly afterwards, but after the death of his father-in-law, resided with the countess during the remainder of her life. Lady Blessington had made her *début* as an authoress in 1822 by the publication of two volumes of Sketches. In 1832 she contributed to the New Monthly Magazine, Conversations with Lord Byron, considered by many as the best of her productions. She also wrote numerous novels, including, among others, The Belle of a Season, The Two Friends, Strathern, and The Victims of Society. None of these have much literary merit, but describe scenes in fashionable life with considerable power, and enjoyed at the time a large share of popularity. She acted as editress, for several years, of Heath's Book of Beauty and the Keepsake, and also of another annual, the Gems of Beauty. In 1849 she proceeded to Paris, whither Count d'Orsay had previously gone, in the hope of obtaining an appointment under Louis Napoleon, with whom they had been intimate during his exile in England. She died suddenly there, on the 4th of June of that year.

BLIGH, WILLIAM, a navigator who has acquired considerable celebrity, from having been the commander of the ship *Bounty* when the crew mutinied in the South Seas and carried her off. She had been fitted out for the purpose of procuring plants of the bread-fruit tree, and introducing these into the West Indies. Bligh, who had sailed with Captain Cook, obtained the command, and in December, 1787, left Spithead for Otaheite, where he arrived, and remained till April, 1789. Having loaded his vessel with plants, he set sail, and was proceeding on his voyage for Jamaica when he was seized in bed, bound, and brought on deck. The launch was lowered, and Bligh, with eighteen men supposed to be well affected to him, were forced into it, with no other provision than 150 lbs. of bread, 32 lbs. of pork, a little rum and wine, and 28 gallons of water. Thus scantily provided they found themselves in the open sea, not far from the island of Tofoa, in lat. 19° S. and lon. 184° E., and managed, by admirable skill and perseverance, though not without enduring fearful hardships, to reach the island of Timor in forty-one days, after running nearly 4000 miles, without the loss of a single man. Ultimately twelve of the number reached England. Of these Bligh was one, and in a second voyage accomplished the object of the first by giving the bread-fruit tree to the West India Islands. This is not the place to detail the future history of the mutineers; but when several of them were afterwards tried at Portsmouth, sufficient evidence was led to show that Bligh himself was not free from blame, and had on many occasions been too much inclined to play the tyrant. This feature in his character was afterwards manifested on a larger scale. In 1806 he was appointed governor of New South Wales, and conducted himself so harshly and illegally, that the other authorities interfered and put a summary stop to his government by placing him under arrest. He died in 1817.

BLIGHT, a generic name commonly applied to denote the effects of disease or any other circumstance which causes plants to wither or decay. It is usually considered as arising from the atmosphere, and to be extremely sudden in its operations, but this popular notion must be allowed to be fallacious, for close observation will generally show that the mischief has been some time in progress. Peculiar conditions of the atmosphere may have concurred to increase the malady, so as to cause it to attract at a particular period general observation; but that is a different point, and one the force of which it is easy to appreciate. These observations are applicable to different forms of mildew, rust, the ravages of minute moulds, and of some destructive insects; but doubtless there are phenomena in the vegetable world dependent on cosmical conditions, which may properly be considered blight, according to the popular notion of the phrase. These arise sometimes directly from drought, especially on stiff clay land, accompanied more or less by weakness of constitution, or from want of vigour or maturity in the seed. It is not unusual to see in a corn-field, where the greater part of the crop is healthy, certain plants in greater or less abundance, which, from the very first, betray a want of constitution by their pale and consumptive aspect. This occurs not only in the cereal crops, but also in other plants which occupy the attention of the agriculturist. There is no fungus nor insect at work, but the seeds of consumption are deeply seated, and seldom fail to break forth ere the plant attain maturity. Sometimes the blight assumes the form of dark charred patches on the leaves or stem, which in some instances arise from the presence of parasitic fungi, but frequently exhibit no traces of them. Sometimes, under every advantage of good cultivation, and without any fault in the seed, crops will still wear a blighted aspect. This arises usually from the balance of circumstances favourable to healthy vegetation not being kept up; and on their restoration to an equilibrium, unless the untoward conditions have been too long maintained, all is right again. There are some forms of blight which it is extremely difficult to understand, but which seem connected in greater or less degree with the attacks of aphides. In these cases, as in the peach-tree, the tender tissues of the leaves are preternaturally developed, and in consequence the leaves are curled and bloated, and ultimately nourish a host of plant-lice. In some cases it is uncertain whether the succulent leaves attract the aphides, or whether the hypertrophy itself does not arise from the puncture of an insect. It must also be mentioned that there is frequently not a trace of aphides where a tree is one mass of deformity from its curled and bloated leaves. Finally, there is a kind of blight sometimes very prevalent, which has been referred to fungi, but which is, in fact, nothing more than an excessive development of the epidermal cells, which are no

longer kept within bounds by the real cuticle. This is very common in vines, and the leaves of the hawthorn are frequently distorted and crumpled by them, especially at the margin. It is probable that in such cases no material injury occurs to the plant, further than diverting the energies which should be employed in producing seed.

BLIND, THE. The loss of the noblest sense, by means of which man receives an idea of the world that surrounds him, clothed in light and colour, is an event as melancholy as it is frequent. Blindness is different, 1. In its degrees, some persons being partially blind, retaining a slight perception of light, with the power of distinguishing very brilliant colours, and the general outlines of bodies; others being entirely deprived of the faculty of seeing; 2. In its causes: some men are blind from their birth; others have become blind by local diseases of the eyes, for instance, by inflammation, suppuration, cancer of the eye-ball, spots, films, tumours on the cornea (by which its transparency is destroyed), also by closure of the pupil, by a turbid state of the humours, by a debility of the optic nerve, or by general diseases of the body, violent fevers, nervous fevers, plethora, and tendency of the blood to the head, erysipelas in the face, small-pox, scarlet-fever, &c., or by excessive exertion of the eyes, by which the optic nerve is enfeebled; for which reason, some classes of mechanics and artists, as blacksmiths, labourers in glass and smelting-houses, watch-makers, &c., not unfrequently lose their sight, and in northern countries, which are covered with snow for a long time, and which dazzle the eyes by the reflection of the sunbeams, as well as in the sandy deserts of Africa, blindness is a frequent complaint. Old age is sometimes accompanied with blindness, occasioned by the drying up of the humours of the eye, or by the opacity of the cornea, the crystalline lens, &c. There are several causes which produce blindness from the birth. Sometimes the eyelids adhere to each other, or to the eye-ball itself, or a membrane covers the eyes; sometimes the pupil of the eye is closed, or adheres to the cornea, or is not situated in the right place, so that the rays of light do not fall in the middle of the eye; besides other defects. Those who are born blind have no idea of vision, and are entirely destitute of all the ideas derived from the sense of sight. They cannot, therefore, be sensible of their misfortune in the same degree as those who have lost their sight at a later period. Experience has shown that those who acquire the power of seeing after being born blind, or having lost their sight in their childhood, form very different ideas of visible objects from other persons. A young man, whom Cheselden couched for a cataract, at the moment he received sight imagined that all the objects which he saw were in contact with his eyes: he could not distinguish objects, although of very different forms. Those with which he was already familiar by the touch he examined with great attention, in order to recognize them another time; but having too many things to notice at once, he soon forgot all that he had observed. He wondered that those persons whom he loved most were not handsomer than others. Before he received his sight he had expressed a great desire to obtain this sense. The other senses of persons, who have been blind for a long time, become more exquisite, perhaps, because they are not subject to the distraction produced by the sight of so many objects. The blind, therefore, are often distinguished for a remarkable mental activity, and a wonderful development of the intellectual powers. Their touch and hearing, particularly, become very acute. Thus it is related of a blind man, who lived at Puisaux, in France, and was a chemist and musician, that he could accurately estimate the proportions of objects, could judge of the distance of fire by the degree of heat, determine the quantity of fluid in vessels by the sound it produced while running from one vessel into another, and the proximity of objects by the effect of the air upon his face. He determined very accurately the weights of bodies and the capacities of vessels. The celebrated Saunderson, professor of mathematics at Cambridge, lost his sight in his early youth. He invented several processes to facilitate his studies in arithmetic and geometry. His sense of touch was so acute, that he distinguished spurious coins merely by letting them pass through his fingers, though they were so well executed that even skilful judges were deceived by them.

BLIND, INSTITUTIONS FOR THE. In the case of persons destitute of sight, it is necessary to have recourse to the other senses to supply the want of the eye. If, for instance, we wish to teach them the arts of reading and writing, letters must be prepared which will be palpable to the touch, and the hand guided until they are able to copy them. If we wish to communicate to them a knowledge of the surface of the earth, globes and maps must be prepared with the divisions, &c., in relief. Knowledge obtained in this way must, of course, be acquired much more slowly than that received by the sight. The senses of touch and of sight differ in this respect, that the former ascends by degrees from the perception of parts to the perception of the whole, whilst the latter views the whole at a single glance. It is therefore evident that the blind cannot be instructed in the common schools destined for those who see: in the first place, because the means of instruction by the touch are wanting; and secondly, because the progress of the other children would be retarded by the slow apprehension of the blind pupils. For these reasons, and as the blind form no small part of the pop. of every country, particular institutions have, in many places, been established for their instruction. In the United Kingdom their number is about 30,000. Zeune, in his Belisar (1821, p. 12 et seq.), has laid down as a general law, deduced from observation, that the proportion of blind persons decreases from the equator towards the poles. In Egypt, he says, it is as 1 to 100, while in Norway the proportion is 1 to 1000.

The instruction given in the schools for the blind aims, first, at a general cultivation of their intellectual faculties. They are afterwards taught some art which may enable them to provide for their own subsistence. These arts are of two kinds—mechanical employments and music. The instruction of the blind, therefore, embraces three branches—1, mechanical labours; 2, the fine arts; 3, science; because it is impossible to determine, without trial, the peculiar genius of the pupils, whether, for instance, they should be instructed as mechanics, musicians, or mathematicians. The German institutions for the blind, as well as those in Paris, have this comprehensive character, whilst the English aim, more exclusively, to impart instruction in mechanical trades. The first idea of such an institution for blind persons was conceived by Valentin Hatiy, brother of the celebrated mineralogist: it was suggested to him by his acquaintance with a blind German lady, the Baroness von Paradis, of Vienna, who visited Paris in 1780, and performed on the organ with general applause. Hatiy repeatedly visited this ingenious lady, and was much surprised to find in her apartments several contrivances for the instruction of the blind; for instance, embroidered maps and a pocket printing apparatus, by means of which she corresponded with Von Kempelen in Vienna (the inventor of the chess-player and speaking automaton), and

with a learned blind gentleman named Weissenburg, at Mannheim. Haüy compared the high cultivation of these two Germans with the degraded state of the blind in France, where, at the annual fair of St. Ovide, an innkeeper had collected ten poor blind persons, attired in a ridiculous manner, and decorated with asses' ears, peacocks' tails, and spectacles without glasses, to perform a burlesque concert. Nor did the great institution for the blind, or the hospital of the 300 (commonly called *les quinze-vingts*, founded in 1260 by St. Louis, after his crusade to Egypt, during which so many soldiers became blind by the ophthalmia prevailing in that country), present to the philanthropic Haüy a pleasing picture of intellectual cultivation, but rather one of dulness and moral corruption. He therefore resolved to do for the blind in France what the Abbé de l'Epée had done for the deaf and dumb. In 1784 he opened an institution in which they were instructed not only in appropriate mechanical employments, as spinning, knitting, making ropes or fringes, and working in paste-board, but also in music, in reading, writing, ciphering, geography, and the sciences. For this purpose he invented particular means of instruction, resembling those with which he had become acquainted by his intercourse with the two blind Germans Paradis and Weissenburg. For instruction in reading he procured raised letters of metal, from which, also, impressions may be taken on paper: for writing he used particular writing-cases, in which a frame, with wires to separate the lines, could be fastened upon the paper: for ciphering there were movable figures of metal, and ciphering-boards in which the figures could be fixed: for teaching geography maps were prepared upon which mountains, rivers, cities, and the borders of countries were embroidered in various ways, &c. In the beginning the Philanthropic Society paid the expenses of twelve blind persons; afterwards, in 1791, the institution was taken under the protection of the state, and united to that for the deaf and dumb; but as this was found inconvenient, it was, in 1795, separated from the latter, and in 1801 united to the hospital of the *quinze-vingts*. The mingling of young blind persons here with old soldiers being found very prejudicial to the former, Haüy, full of indignation, went to St. Petersburg in 1806, in order to establish a similar institution there. After the restoration in 1816, the establishment was put upon its original footing, and the physician Dr. Guillié appointed its director.

Next to France the first institutions for the blind were established in Great Britain, where, however, they are supported only by the contributions of private individuals. In 1790 an institution of this sort was established at Liverpool, in which both males and females are instructed in manual labours, in singing hymns, and playing on the organ. In 1791 a second one was established in Edinburgh, which has all along been managed with great judgment and success. Similar institutions have since arisen in other places; one at London in 1800, others at Dublin, Glasgow, Bristol, Norwich, &c.

In Germany the first public institution for the blind was established by the King of Prussia at Berlin, in 1806, when Haüy passed through this city. Zeune was appointed director of it. He invented many instruments more simple than those which had formerly been used, and which answered the purpose very well. Among other things, he brought to great perfection maps and globes, destined for the use of the blind; which, in many parts of Europe, are used for the instruction of others also, since they present, by means of elevations and depressions of the surface, proportional elevations and pictures, which strike the mind forcibly. In arithmetic he directed his attention almost exclusively to mental calculations. The first institutions for the blind in Germany, after that in Berlin, were established in Vienna and Prague, both in 1808, and in the same year that in Amsterdam, founded by freemasons. In 1809 the institution in Dresden sprang up—a branch of that in Berlin. In 1810 the institution in Zürich was founded by the auxiliary society. In 1811 a similar establishment was instituted in Copenhagen, after the plan of Professor Brorson, by the Society of the Chain, as it is called. After the great war for liberty from 1813 to 1815, when the Egyptian ophthalmia raged so dreadfully among the European armies, several institutions for blind soldiers were established on Zeune's plan in Prussia. Their object was to instruct soldiers who had become blind and unable to exercise their former business in useful labours. These schools were at first intended to continue only till all the soldiers received in them had thoroughly learned some trade: two of them, however, those at Breslau and Königsberg, have been put upon a permanent footing. The institution for the blind in St. Petersburg, which was established by Haüy, but was never in a very prosperous state, seems to have declined greatly after its founder's return to France in 1816.

Institutions for the blind are confined almost entirely to Europe, and they appear to be peculiar to Germany, Switzerland, Holland, Denmark, France, Britain, and Russia. Father Charlevoix, indeed, says that in Japan the records of the empire are committed to the memory of the blind; and Golownin estimates their number in the gigantic city of Jeddo alone at 36,000; but neither of them mentions that there is any institution established for them. The director of the institution in Vienna, F. W. Klein, has published a good Lehrbuch zum Unterrichte der Blinden, &c., um sie zu Bürgerlicher Brauchbarkeit zu Bilden (Text-book for the Instruction of the Blind, &c., to render them Useful Citizens). The first institution of the kind in America, where there are now nearly twenty, was commenced in Boston in the year 1829.

Various systems have been devised for the purpose of teaching the blind to read, some of which consist in the use of the ordinary Roman alphabet, with more or less modification, and some of which are quite arbitrary. All of them are printed in embossed type, to enable the blind to read by means of the touch, a sense which, as is well known, is developed to an extraordinary degree among the blind. In spite of the apparent simplicity of some of the arbitrary alphabetical systems, and in spite of the eagerness with which each of them is recommended by its supporters, it is generally thought that the Roman alphabet is best adapted for use by the blind. It has certain obvious recommendations which the others do not possess, among which the chief are, that a blind person may be guided in learning to read by one who is only acquainted with the Roman alphabet, and that he may be taught to write also so as to be understood by those who are not blind without having to learn another alphabet. The first who employed the Roman characters in raised printing for the blind was Mr. Alston of Glasgow, and his system is pretty widely acknowledged to be the best. Only capital letters are used in it. In America several books for the blind have been printed on a similar system. The capitals used in them, however, are smaller than those of Mr. Alston, and the edges are serrated. The smaller size of the type renders it very difficult to read by those who have learned from the larger type of Mr. Alston. The simplest and best of the arbitrary alphabetical systems is that of Mr. Moon, which has been adopted

to a considerable extent not only in our own country but also in Germany. It consists in the use of simpler forms for the letters than those of the Roman alphabet. One peculiarity of this system is that it is printed alternately from left to right and from right to left, so that the reader has no difficulty in following the lines of the page he is reading. A society in Berlin which has been formed to carry out the ideas of Mr. Moon has already printed the Psalms and the Gospels in German in this style. Another well-known arbitrary system is the French Système Braille. In it the letters and figures are all represented by dots, and it is extremely complicated.

BLINDS, in operations against fortresses, the name of all preparations which tend to intercept the view of the enemy. There are several species:—1. A fascine placed across the embrasures, to prevent the enemy from observing what passes near the cannon. —2. Blinds before port-holes are shutters made of strong planks, which are placed before the port-holes, as soon as the guns are discharged, to obstruct the enemy's view.—3. Single and double blinds. The former consists of three strong perpendicular posts, 5 feet in height, between which are planks covered with iron plates on the outside, and thus made shot-proof. This screen is furnished with rollers, to enable the labourers in the trenches to push it before them. The latter consists of large wooden chests, on four block wheels, which are filled with earth, or bags of sand, and serve likewise in the trenches, &c., to cover the soldiers from the fire of the enemy. —4. Another kind of blinds used to protect the workmen in the trenches, are the chandeliers. Two square beams of timber are placed parallel, and at a distance of 6 feet, on the ground, and fastened by two cross beams. Upon the ends perpendicular posts are erected, and the interval is filled up with fascines, at least to a height of 5 feet.—5. *Blind* is also the name given to coverings placed over the most exposed parts in the saps or the fortress. These are made of beams over which hurdles or fascines are spread, that finally receive a sufficiently thick layer of earth as a covering.

BLIND-WORM, or SLOW-WORM (*Anguis fragilis*), an interesting little reptile belonging to the skink family (Scincidæ), and forming a connecting link between the lizards and the snakes. It is perfectly snake-like in form, having no appearance of external limbs, but the bones of the shoulders and pelvis exist in a rudimentary form. Its average length is about a foot, and it is of nearly equal thickness throughout, but rather more slender towards the tail, the tip of which is abrupt. The colour of the upper surface is brownish gray, with a silvery gloss, and there are several rows of obscure dark dots running down the sides, and a black line down the middle of the back. The under parts are bluish black. Its eyes, though brilliant, are small, and hence it has received its common English name. It is found in every part of Great Britain, though not in Ireland, and is spread over almost the whole of Europe, Western Asia, and Northern Africa. Though it is usually considered by the country people to be highly venomous (Shakspeare calls it the 'eyeless venom'd worm,' and speaks of 'the blind-worm's sting'), no creature is more harmless than the blind-worm. It rarely attempts to bite, and when it does the smallness of its teeth prevents it from making almost any impression on the skin. It receives its specific name of *fragilis* from the fact that when frightened it stiffens its muscles to such an extent, and becomes so rigid, that its tail may be snapped off by a slight blow, and very often fright alone causes the animal to leave this member behind it. It passes the winter in a state of insensibility, generally burrowing into the soft earth to the depth of 3 or 4 feet, for the purpose of hybernating. In summer it may frequently be seen on a sunny bank, or beneath a hedge, basking in the sun. Its food consists of insects, earth-worms, slugs, &c. It is one of those reptiles that are ovo-viviparous, that is, whose young are hatched from the egg in the body of the parent before being brought into the world.

BLISTER, a topical application which, when applied to the skin, raises the cuticle in the form of a vesicle, filled with serous fluid. The powder of the *cantharis*, or Spanish fly, operates with most certainty and expedition, and is commonly used for this purpose, as well as mustard, hartshorn, &c. Morbid action may often be removed from the system by inducing an action of a different kind in the same or a neighbouring part; hence the utility of blisters in local inflammation and spasmodic action. Exciting one pain often relieves another; hence the use of blisters in toothache, and some other painful affections. Lastly, blisters communicate a stimulus to the whole system, and raise the vigour of the circulation; hence, in part, their utility in fevers of the typhoid kind, though, in such cases, they are used with still more advantage to obviate or remove local inflammation.

BLITUM, a genus of plants belonging to the natural order Chenopodiaceæ. Two of the species are known by the name of the strawberry blite, because, after flowering, the calyx spreads out, and bears, in size, colour, and general appearance, a strong resemblance to the common wood strawberry. They are of no economical importance, but yield a colouring matter which was formerly used in cookery. Though not natives of Great Britain, they are common weeds in the S. of Europe.

BLOCH, MARCUS ELIEZER, a naturalist of Jewish descent, born at Anspach in 1723, of poor parents. In the nineteenth year of his age he understood neither German nor Latin, nor had he, with the exception of some rabbinical writings, read anything. Nevertheless he became tutor in the house of a Jewish surgeon in Hamburg. Here he learned German and Latin, and besides acquired some knowledge of anatomy. His principal work is the Naturgeschichte der Fische (Natural History of Fishes), folio, 1785–1799, which is adorned with many coloured plates. He enjoyed a well-deserved reputation, and died in 1799.

BLOCKADE is the interception by one belligerent of communication with a place occupied by another. National sovereignty confers the right of declaring war, and the right which nations at war have of destroying or capturing each other's subjects or goods imposes on neutral nations the obligation not to interfere with the exercise of this right within the rules and limits prescribed by the law of nations. In order to render the communication with a place unlawful to a neutral, a blockading or besieging force must be actually present, investing it, and sufficiently powerful to render a communication with it dangerous to a neutral, and expose him to seizure by the blockading or besieging force. A declaration of siege or blockade is an act of sovereignty, but does not require, in all cases, a direct declaration by the sovereign authority of the besieging belligerent; for its officers may be invested, either expressly or by implication, with authority to institute such siege or blockade. It must, however, in order to be lawful and obligatory on neutrals, be declared or sanctioned, either expressly or by implication, by the sovereign power. It must also be declared or made public, so that neutrals may have notice of it. If a blockade is instituted by a sufficient authority, and maintained by a sufficient force,

a neutral is so far affected by it, that if he attempts to trade with the place invested, either by carrying goods to it, or bringing them away, the property so attempted to be carried to or from the place is liable to be seized by the investing party, and in case of being seized is forfeited.

BLOCKHOUSE, in fortification, a house made of beams joined together crosswise, and often doubled, with a covering and loopholes, large enough for from 25 to 100 men. In addition to this, it is commonly covered with earth, to render it entirely bomb and fire proof. It is usually sunk several feet into the ground. Some forts of this kind contain two stories; and they are often fitted up to receive cannon. Blockhouses are generally built in the form of a square or a cross. Their use is to afford a feeble garrison of an important place, which is very much exposed, an opportunity of holding out against the cannonade and assault of the enemy till they are relieved. They also serve for bomb-proof guard-houses, and places of last resort, in the interior of intrenchments, and in the covered passages of fortresses, where the cannon are stationed.

BLOCKS are pieces of wood in which sheaves or pulleys are placed, for the purpose of forming tackle, purchases, &c., in various operations in naval tactics and architectural constructions. The mechanical power is described in article MECHANICS (which see). Blocks are single, double, treble, or fourfold, according as the number of sheaves is one, two, three, or four. The sheaves are grooved to receive the rope, and have in their centre a brass *bush*, or triangular piece of brass, to receive the *pin* on which they revolve. The sides of the block are called *cheeks*. A *running* block is attached to the object to be moved; a *standing* block is fixed to some permanent support. Blocks also receive different denominations from their shape, purpose, and mode of application, which cannot well be explained without the use of figures. No less than 200 different sorts and sizes are made at Portsmouth, England, for the royal navy, besides which there are various sorts used only in the merchant ships. The machinery for supplying the royal navy with blocks is the invention of Mr. (afterwards Sir Mark I.) Brunel. It enables four men, in a given time, to complete the shells of as many blocks as fifty men could do by the old method; and the blocks produced by the machinery far surpass in make those produced by the hand. Iron blocks and sheaves have been introduced both into the naval and the merchant service with great success.

BLOEMAART, sometimes also called BLOM, ABRAHAM, a Dutch painter, born at Gorkum about 1565, died at Utrecht in 1657, or according to others, but less probably, in 1647. His paintings are reproached with various faults, yet he is distinguished by the brilliancy of his colouring and the richness of his invention. In the representation of the *chiaro-oscuro* he may be called great. He painted all sorts of objects; but his landscapes are the most esteemed. He had four sons, of whom the youngest, Cornelis, is the most distinguished. He was born at Utrecht in 1603, and died at Rome in 1680. He was an engraver, and his engravings are distinguished for purity, elegance, and softness. He was the founder of a new school, from which proceeded Baudot, Poilly, Chastean, Speier, Roullet, &c.

BLOIS (anciently *Blesum*), the capital of the French department Loire-et-Cher, 99 miles S.S.W. Paris, is beautifully situated on the right bank of the Loire, from which it rises in the form of an amphitheatre. It consists of an upper town, with very narrow and crooked streets; a lower town, with many handsome houses, extending along a handsome quay; and of several suburbs, with one of which it communicates by a stone bridge of eleven arches. Pop. 20,331. The Castle of Blois is rich in historical associations. It was long occupied by the counts of the name, and became a favourite residence of the Kings of France. Louis XII. was born, Francis I., Henry II., Charles IX., and Henry III. held their courts in it; and the Guises, by a cruel though not unjust retribution, were murdered in it.

BLOMFIELD, CHARLES JAMES, Bishop of London, a prelate of great learning and zeal in promoting the interests of religion, was the son of a schoolmaster at Bury-St.-Edmunds, Suffolk, and born there in 1786. He studied for the church at Cambridge, where he took high honours; and after filling successively several curacies, and acting for a time as chaplain to the Bishop of London, was presented to the rectory of St. Botolph, Bishopsgate. In 1824 he was made Bishop of Chester, and in 1828 Bishop of London. He acquired considerable renown as a classical scholar from the editions published by him of several of the dramas of Æschylus, and he also published an edition of Callimachus, which is much esteemed. Along with Rennel he edited, in 1812, the Musæ Cantabrigienses, and in 1814, along with Monk, the Posthumous Tracts of Porson, followed two years afterwards by the Adversaria Porsoni. In his ecclesiastical capacity he displayed great zeal and energy, more churches having been built in London under his episcopate than under that of any bishop since the Reformation. He incurred, however, some animadversions on his proceedings in relation to the Tractarian controversy by a vacillating policy, which gave satisfaction to neither of the parties. He died at Fulham, on 5th August, 1857.

BLOMFIELD, EDWARD VALENTINE, brother of the preceding, was born in 1788, studied in Caius College at Cambridge, and excited the highest expectations. Among several prizes which he received, we may mention the medal assigned him in 1809 for his beautiful ode In Desiderium Porsoni. In 1812 a fellowship in Emmanuel College was conferred on him. In 1813 he visited Germany, where he acquired a good knowledge of the German language, and became acquainted with Wolf in Berlin, and Schneider in Breslau. After his return he wrote in the Museum Criticum, or Cambridge Classical Researches, remarks on German literature, which were received with approbation. The University of Cambridge appointed him one of the preachers of St. Mary's Church. He began a translation of Schneider's Griechisch-deutches Lexicon, but did not live to finish it. Matthiæ's Griechische Grammatik, however, he translated completely. His translation was published by his brother, and everywhere well received. He was in Switzerland in 1816 with his pupil, a young nobleman, and in his haste to return to Cambridge, on hearing that he was appointed proctor for the following year, the fatigue of rapid travelling occasioned a sickness of which he died in October, 1816.

BLONDEL, a confidential servant and instructor in music of Richard Cœur de Lion of England, about the year 1190. While his master was the prisoner of the Duke of Austria, Blondel went through Palestine and all parts of Germany in search of him. He understood, it is said, that a prisoner of rank was confined in Löwenstein Castle, and hastened hither. Placing himself under a grated tower, he began to sing one of the French lays which he had formerly composed for Richard. Scarcely had he finished the first stanza, when a voice from the dungeon of the tower responded. Thus he discovered his king, delivered him, and gained the name of the *faithful Blondel*. Grétry's fine opera, Richard Cœur de Lion, is founded on this anecdote.

BLOOD is the red fluid contained in the blood-vessels of animal bodies. It is found in the mammalia, in birds, in reptiles, and in fishes. In the last two classes of animals the temperature of the blood is much lower than in the former, for which reason they are distinguished by the name *cold-blooded*, while the others are termed *warm-blooded* animals. Insects and worms, instead of red blood, have a juice of a whitish colour, which is called *white blood*. In the blood two different substances are contained, which are separated by coagulation—the *serum*, a fluid like the white of an egg, and a thick matter, to which the red colour properly belongs, which is much heavier than the former, and is called the *coagulum*. The last may be divided again into two different parts —into the *cruor*, or that part of the blood which is intrinsically red and coagulable, and *lymph*, or *fibrine*, to which the coagulation of the blood must be ascribed. The fibrine in young animals is much whiter than in older and stronger ones. The blood of the latter contains much more nitrogen than that of the former. If the nourishment of animals is changed, we also find an alteration in the constituent parts of their blood. It is also changed by diseases. In animals that are hunted to death, or killed by lightning, the blood does not coagulate. The blood of birds is more highly coloured and warmer than that of viviparous animals, and coagulates more easily in the air. That of reptiles and fishes coagulates with difficulty. Aided by magnifying-glasses of a strong power, one may observe in examining the blood of the living animal, or in blood which is newly drawn, that it consists, especially the cruor, of little globular bubbles, the *globules* of the blood, as they are called, the diameter of which amounts to about the three-hundredth part of a line. In blood that has been drawn some time, although this time may be very short, they are not to be discovered. They are the effect of the life that pervades the blood. The more robust and healthy an animal is the more globules are perceived. They show, as it were, the transition from the formless liquid to the original form of the first organized matter. The blood is of the greatest importance to the life of an animal, and may be considered as the source of life. As long as the body is living, the blood is in perpetual motion. When it is taken out of the body, a remarkable change soon follows: it begins to coagulate, and then undergoes, first, an acetous, and after a few days a putrid fermentation. All the blood takes its origin from the chyle, and deposits by degrees the nourishing particles requisite to the preservation and growth of the body, by a multitude of vessels adapted thereto. This is done while it is driven from the heart into the remotest parts of the body, and from thence back. The circulation of the blood is, as it were, the principle and first condition of life. With it, except in cases of fainting, suffocation, &c., life ceases. The heart, the centre of the circulation of the blood, has a twofold motion, of contraction and dilatation, which constantly alternate. With the heart two kinds of vessels are connected—the arteries and the veins. (See BLOOD-VESSELS.) The circulation of the blood proceeds with an astonishing rapidity: did it flow at an equal rate in a straight line, it would run in the space of one minute through 149 feet. This swiftness, however, exists only in the larger vessels near the heart; the farther the blood recedes from the heart, the slower its motion becomes. In a grown-up person in good health we may reckon on the mass of blood at 24–30 lbs.

BLOOD, AVENGER OF, in Scripture, the nearest relation of any one that had died by manslaughter or murder, so called because it fell to him to punish the person who was guilty of the deed. In the political law of Israel the practice of punishment by the nearest relative, which had always been prevalent, was allowed to continue, while rules were laid down to prevent the chief abuses connected with it. The distinction was sharply drawn between murder and manslaughter. For the former no ransom or satisfaction was permitted. In the case of the latter, however, there were six cities set apart out of the number which the Levites occupied, placed at suitable distances over the extent of the land, three on each side of the Jordan, with roads leading to them which were well kept up, and these were cities of refuge to which the manslayer might flee, and within which he might dwell in safety without fear of the avenger. But he was not permitted to return to his own place; in fact, he had no safety, if he left his place of refuge, until the death of the high-priest during whose term of office his misfortune had occurred. See REFUGE (CITIES OF).

BLOOD, THOMAS (commonly called Colonel Blood), was a disbanded officer of Oliver Cromwell. He took part in the Revolution in various ways, and made an attempt to steal the crown and regalia from the Tower, in which he almost succeeded. Being, however, taken, he confessed his purpose, without showing the least fear of death. Charles II. from idle curiosity went to see him, and Blood persuaded the monarch to pardon him. Charles even bestowed an estate with £500 a year upon him, whilst poor Edwards, the keeper of the jewel-office, who valiantly defended the crown, and was wounded, lived forgotten.

BLOODHOUND, a variety of the common dog, called *Canis sagax* by Linnæus, *chien courant* by Buffon, remarkable for the perfection of its sense of smell. Owing to this circumstance these hounds were formerly much employed in pursuing criminals escaped from justice, or in tracing out robbers or enemies, whose course was inevitably discovered when once the bloodhound was placed upon their trail. In the border country of Scotland they were formerly much employed for such uses, but at present the race has become almost forgotten. In the countries of South America the Spaniards employed fierce dogs to aid them in conquering the Indians, and in the Southern United States bloodhounds were employed to track runaway slaves. All the varieties of hound, however, have much sagacity, and most of the larger and stronger breeds have great acuteness of scent, and might without much difficulty be trained to act as bloodhounds.

BLOOD-VESSELS are the tubes or vessels in which the blood circulates. They are divided into two classes—arteries and veins—which have two points of union or connection—the first in the heart, from which they both originate, and the other in the minute vessels or net-work in which they terminate. The arteries arise from the heart and convey the blood to all parts of the body; the veins return it to the heart. The arteries distribute throughout the body a pure red blood, for the purposes of nourishment; while the veins return to the heart a dark-coloured blood, more or less loaded with impurities, and deprived of some of its valuable properties. But this is not returned again to the body in the same state. For the heart is wisely divided into two portions or sides, a right and left, one of which receives the impure blood from the veins and sends it to the lungs to be defecated and freshly supplied with oxygen or vital air, while the other receives the pure red blood from the lungs, and circulates it anew through the arteries. The arteries arise from the left ventricle of the heart by one large trunk nearly an inch in diameter. This is gradually subdivided into smaller ones, as it proceeds towards the limbs, till they terminate at last in

vessels so small as to be almost invisible, and in a fine net-work of cells extending through the whole body, in which the blood is poured out, and nutrition, or the increase of the body, takes place, and from which the residue is taken up by the small veins, to be returned to the heart. The arteries and veins are widely different in their structure as well as their uses. The former are composed of very strong, firm, elastic coats or membranes, which are four in number. The external covering and the internal lining of the arteries, although belonging to different classes of membranes, are both very thin and soft. The second coat is very thick, tough, and elastic, being that which chiefly gives their peculiar appearance to the arteries. The third is formed of fibres, apparently muscular, arranged in circular rings around the tube of the vessels. It is well known that the pulse of the heart is felt in the arteries alone, although in the bleeding of a vein we sometimes see the blood start as if in unison with the beating of the heart. The pulse is produced by the wave or stream of blood which is driven by the heart through the arteries, distending and slightly elevating them, after which they instantly contract from their elasticity, and thus force the blood into the smaller vessels. The pulse varies in its character with the general state of the health. (See PULSE.) When arteries are cut or wounded the firmness of their coats prevents their closing, and hence arises the fatal nature of wounds of large vessels, which will remain open till they are tied up, or till death is produced.

The veins commence in small capillary tubes in every part of the body, and by their gradual union form large trunks till they at last terminate in two (one ascending from the lower parts of the body, the other descending from the head and arms), which pour their contents into the heart. Their structure is much less firm than that of the arteries. They are very thin and soft, consisting of only two thin coats or membranes. The inner or lining membrane is frequently doubled into folds, forming valves, which nearly close the passage in the veins, and thus give very material support to the blood as it is moving up in them towards the heart. These valves are not found in the veins of the bowels, the lungs, or the head. The number of the veins is much greater than that of the arteries, an artery being often accompanied by two veins. They differ also in this, that while the arteries are deeply seated in the flesh, to guard them from injury, the veins are very frequently superficial, and covered only by the skin. The veins, it is well known, are the vessels commonly opened in blood-letting, although in cases which render it necessary a small artery is sometimes divided.

There are two portions of the venous system which do not correspond exactly with our general description; these are the veins of the bowels and of the lungs. The former circulate their blood through the liver before it returns to the heart, and the latter, the pulmonary veins, convey red blood from the lungs to the heart. (For an account of the circulation of the blood, see HEART.) It should also be mentioned that the large vein which brings back the blood from the lower part of the body, receives from the lymphatic and lacteal vessels the chyle from the bowels which supplies the waste of the blood and nourishes the body, and the serous and other watery fluids which are taken up by the absorbents in all parts of the body.

BLOOMER COSTUME, THE, a style of dress introduced about the year 1849 by Mrs. Bloomer of New York, who proposed thereby to effect a complete revolution in female dress, and add materially to the health and comfort of the fair sex. It consisted of a jacket with close sleeves, a skirt reaching a little below the knee, and a pair of Turkish pantaloons secured by bands round the ankles. Though adopted rather extensively in America, it was unable to hold its ground against the united strength of prejudice and ridicule, and in Britain it scarcely made further way than furnishing a favourite subject of burlesque on the stage, and of ridicule in the pages of Punch. One or two 'strong-minded females,' who ventured to brave public opinion by donning the new costume, were so hooted and persecuted by the mob as to be glad to effect a speedy retreat.

BLOOMFIELD, ROBERT, an English poet, born at Honington in 1766, the son of a tailor, learned to read at the village school, and in 1781 was sent to learn the trade of a shoemaker with his brother in London. The visiting of several places of worship, of a debating society, of Covent Garden Theatre, and the reading of sundry books, called forth his faculties, and he became almost unconsciously a poet. Hearing him one day repeat a song which he had composed, his astonished brother prevailed on him to offer it to the London Magazine, and it was accepted. The piece was called the Milkmaid. A second, the Sailor's Return, likewise found a place in that journal. Thomson's Seasons, the Paradise Lost, and other works of this kind, now became the subjects of his constant study. In the country, where he resided for a short time in 1786, he first conceived the idea of his poem the Farmer's Boy, which is characterized by a spirit of rural simplicity and innocence. It was written under the most unfavourable circumstances by a journeyman shoemaker in a garret. It was first shown to Capel Lofft in 1798, who was so much pleased with it, that, in conjunction with his friend Hill, he had it printed in 1800. Bloomfield was patronized by the Duke of Grafton, who bestowed on him a small annuity, and made him an under-sealer in the seal-office. This situation he was forced to resign on account of ill health. He then worked again at his trade as a shoemaker, and employed himself in constructing Æolian harps. Engaging in the book trade he became a bankrupt, and in the latter part of his life was afflicted with violent headaches, and became nearly blind. He was gradually reduced to such a state of nervous irritability, that apprehensions were entertained of his becoming insane. These fears were terminated by his death, which took place in August, 1823.

BLOUNT, SIR HENRY, born at Tittenhanger, Hertfordshire, in 1602, studied at Oxford, became a lawyer, travelled through various parts of the s. of Europe and Egypt, and published an account of his travels, which, though not distinguished by accuracy, were interesting, and passed through at least eight editions. He was knighted by Charles I., and during the civil war took part with the royalists. He was present at the battle of Edgehill, and is said to have been intrusted with the young princes. After the king's death he came to London, and was employed by Cromwell and the Parliament in several important affairs. He died in 1682. His infidel tendencies became more fully developed in his son CHARLES (born 1654), who made himself known as a deistical writer, and is said to have had the assistance of his father in writing a work called Anima Mundi, or a Historical Account of the Opinions of the Ancients concerning the Human Soul after Death, &c. Charles Blount wrote various other works of the same nature, containing open or covert attacks on Christianity, and afterwards gave practical proof of the effect of his principles on his own mind by committing suicide, Aug. 1693.

BLOW, JOHN, a musical composer of some celebrity, born in 1648, obtained the degree of Doctor of Music, and at the death of Purcell in 1695, suc-

ceeded him as organist of Westminster Abbey. He was afterwards appointed composer to the Royal Chapel, and died in 1708. His secular compositions were collected and published under the name of Amphion Anglicus.

BLOWING-MACHINE, an engine employed at iron-works and other places for supplying large furnaces with a blast of air. It is necessary that the current of air should be propelled into the furnace with a certain rapidity, volume, and also with regularity; for which purpose many contrivances have been employed. One of the simplest is to use two of the ordinary bellows, so that while the one is emptying the other may be filling. A still better way is to use what is called the double-bellows, which is a machine made like two common bellows joined together by one of their boards, the double bellows thus having three boards instead of two like the single bellows, and two chambers instead of one. The upper chamber, to which the exit-pipe is attached, is filled from the lower, which is itself filled by means of a lever in the same way as the single bellows. The upper chamber is thus always supplied with air, which is forced out through the exit-pipe by a weight or spring. But even this form does not completely attain the objects desired, and various other machines have been devised to secure greater regularity in the blast. Most of these depend on the principle of forcing air into large cylinders, and allowing it to escape under a regulated pressure, and the chief point of difference in the machines is as to the manner in which the pressure is regulated.

In the smelting of iron the cold-blast has now been almost entirely superseded by the hot-air blast introduced by Mr. Neilson of the Clyde Iron-works about 1828, and nineteen-twentieths of the iron made in the kingdom is smelted by the latter process. The blowing apparatus is still essentially the same; but before entering the furnace, the air now passes through a series of arched pipes in a heating oven, by which its temperature is raised to 600° or more. The effect of the air is thus greatly increased, and the hot-blast is justly regarded as the most important modern improvement in the art of smelting. See IRON.

BLOWPIPE is the name applied to an instrument by means of which the flame of a candle or lamp is made to produce an intense heat, capable of being applied to a variety of useful purposes. Its most simple form is that of a tapering tube, about 8 inches in length, and curved nearly at right angles, within 2 inches of its smaller extremity. At its larger end it is nearly ¼ inch in diameter, and at the smaller only large enough to admit a common-sized pin. It is made of brass or white iron. In using it the flame of a lamp or candle is turned aside from its vertical to a horizontal direction by a stream of air impelled upon it, either from the lungs or from a double bellows. The flame in its new direction assumes a conical shape, and consists of two parts, visible by their different colours, the outer being reddish-brown, and the inner blue. The heat at the apex of the inner cone is the most intense, and is equal to that produced in the best furnaces. It is employed by the jeweller and goldsmith in the operation of soldering, and by other artists who fabricate small objects in metal; by the glassblower in making thermometers, barometers, and other glass instruments; by the enameller, and indeed wherever it is required to subject a small body to a strong heat.

The common blowpipe has undergone a variety of improvements in the hands of the chemist, to whose researches it has proved an excellent auxiliary. Fig. 16, Pl. XIV., represents the common blowpipe, being simply a tapering brass tube, having the smaller end, from which the stream of air is transmitted to the flame, curved so that the jet shall be sent sidewise to the operator. Fig. 12 represents the portable blowpipe of Wollaston; it consists of three pieces fitted into one another when in use, but which may be taken down and made to slide within each other, and carried within the pencil-case of a common pocket-book. Fig. 13 represents a blowpipe having a hollow bulb near the end, the object of which is to condense the vapour of the breath, which often proves injurious in the common form of the instrument. To prevent corrosion from the action of the moisture, the bulb is made either of silver or sheet-tin, and it is capable of being opened in order that it may be more easily cleaned. A little practice is necessary to enable the operator to keep up a constant blast for any length of time, the current of air being propelled through the pipe by the muscular exertion of the cheeks, while respiration is carried on through the nose. But when the process has to be long continued, even the operator of experience will find this burdensome, and the current of air is, in that case, supplied by bellows, the apparatus assuming the form represented in fig. 15. This is the blowpipe commonly used by glassblowers. Another form of the blowpipe is that called the Eolipile. It consists of a hollow globe of brass mounted on a stand. The globe contains alcohol, which is made to boil by the action of the lamp below it, the flame of which is also acted upon by the blowpipe led from the globe. In order to prevent the vapour from becoming too strong, there is furnished at the top a safety-valve, loaded with the necessary pressure. This form of the blowpipe is, however, found not to be very effective. The gas blowpipe, commonly called the oxyhydrogen blowpipe, is represented in fig. 14. The structure of the instrument is due to Mr. Newman of London. Sir H. Davy suggested the employment of gases instead of common air, and Dr. Clarke of Cambridge subjected it to extensive application. Dr. Clarke found that a mixture of two volumes of hydrogen and one of oxygen produced the greatest effect. These gases are contained in a bladder A, attached to the end of a pipe B, which leads into the cylinder C, in which is fitted a piston, working through a collar at the top. By the action of this piston the gas from the bladder is compressed into the copper chamber D, and thence issues to the flame through the blowpipe E. To guard against explosions, the gases are kept in separate holders, and by means of a special kind of burner are prevented from mixing until they are just going to be burned. There are various other species of blowpipe, and many uses to which they may be applied, to discuss which would be inconsistent with the nature of this work; but for ample information on the subject see Plattner on the Blowpipe.

BLÜCHER, GEBHARD LEBERECHT VON, of the family of Grosen-Rensow, in Mecklenburg, Prince of Wahlstadt, field-marshal of the King of Prussia, and knight of almost all the distinguished military orders of Europe, was born at Rostock, Dec. 16, 1742. When he was fourteen years of age his father, a captain of horse in the service of Hesse-Cassel, sent him to the island of Rügen. Here the sight of some Swedish huzzars excited in him the desire of becoming a soldier. His parents and relations in vain attempted to dissuade him from this step; he took service in a Swedish regiment of huzzars in the capacity of a cornet. His first campaign was against the Prussians, and he was taken prisoner by the same regiment of huzzars which he afterwards commanded with so much honour. The commander of this regiment, Colonel von Belling, induced him to enter into the Prussian service. An exchange was agreed upon

with the Swedes, and Blücher was made lieutenant in Belling's regiment. Discontented at the promotion of other officers over his head, he left the army, devoted himself to agriculture, and by industry and prudence acquired an estate. After the death of Frederick II. he became a major in his former regiment, which he commanded with distinction on the Rhine in 1793 and 1794. Orchies, Luxemburg, Frankenstein, Oppenheim (Jan. 16, 1794), Kirrweiler and Edisheim in the Palatinate, bear witness to his achievements. After the battle of Kirrweiler, in 1794, which added greatly to his reputation, he was appointed major-general of the army of observation stationed on the Lower Rhine. In 1802, in the name of the King of Prussia, he took possession of Erfurt and Mühlhausen. Oct. 14, 1806, he fought at the battle of Auerstädt. He then with the greater part of the cavalry followed the retreat of the Prince of Hohenlohe to Pomerania. His squadron, moving on the left of the main army, became separated from it so far that a junction was possible only by means of forced marches both in the day-time and at night. The latter Blücher thought himself not authorized to venture upon, and the Prince of Hohenlohe was forced to surrender at Prenzlau. Blücher, cut off from Stettin by this accident, threw himself into Mecklenburg, where he joined at Dambeck the corps of the Duke of Weimar, commanded by Prince William of Brunswick-Oels. All the troops, however, were too much fatigued to undertake any enterprise. Having the Grand-duke of Berg on his left flank, the Prince of Ponte-corvo in his front, and Marshal Soult on his right, Blücher was obliged to take post behind the Trave in order to draw off the three great divisions of the French forces from the Oder as long as possible. With this view he entered into the territory of the free city of Lubeck. This city was soon stormed by the overwhelming power of the French. Although Blücher with some troops escaped out of the city, yet being deprived of all means of defending himself, or continuing his flight, he was obliged to surrender at Ratkau on the 6th of Nov. This, however, he would not do until permission had been granted him to add the following clause to the instrument, that 'the capitulation was offered to him by the Prince of Ponte-corvo, and that he accepted it only from want of ammunition, provisions, and forage.' Blücher was now a prisoner of war; but he was soon exchanged for the French general Victor, and immediately after his arrival at Königsberg placed at the head of a corps, and sent by water to Swedish Pomerania to share in the defence of Stralsund, and to assist the efforts of the Swedes. After the Peace of Tilsit he laboured in the department of war at Königsberg and Berlin. He then received the chief military command in Pomerania, but at the instigation of Napoleon was afterwards with several other distinguished men, dismissed from the service. In the campaign of 1812, when the Prussians assisted the French, he took no part; but no sooner did Prussia rise against her oppressors than Blücher, already seventy years old, engaged in the cause with all his former activity. He was appointed commander-in-chief of the Prussians and the Russian corps under General Winzingerode, which at a later period was separated from him. His heroism in the battle of Lützen (May 2, 1813) was rewarded by the Emperor Alexander with the order of St. George. The battles of Bautzen and Hanau, those on the Katzbach (see WAHLSTADT) and Leipzig, added to his glory. On the Katzbach Blücher defeated the army of Marshal Macdonald, and delivered all Silesia. His army now received the name of the *Silesian*. Napoleon himself endeavoured in vain to check the *old general of huzzars*, as he called him. Oct. 3, Blücher crossed the Elbe at Wartenburg. This bold step compelled the great Bohemian army under Schwartzenberg, and the northern army under the Crown-prince of Sweden, to act with more spirit. The great battle of Leipzig approached. Oct. 16, he gained a signal advantage over Marshal Marmont at Möckern, forcing his way as far as the suburbs of Leipzig. On the 18th, in connection with the Crown-prince of Sweden, he contributed greatly to the defeat of the enemy, and on the 19th his troops made the first assault upon Leipzig. His promptitude and peculiar manner of attacking had already, in the beginning of the campaign, procured him from the Russians the name of *Marshal Forward*. From that time it became his name of honour throughout the whole German territory. Jan. 1, 1814, with the Silesian army, which now consisted of two Prussian, two Russian, one Hessian, and one mixed corps, he crossed the Rhine at Kaub, took possession of Nancy on the 17th, gained, February 1, the battle of La Rothière, and pushed forward towards Paris. His detached corps were, however, checked by Napoleon; yet Blücher, though with a great loss, effected his retreat towards Chalons. He then crossed the Aisne at Soissons, joined the northern army, obtained, March 9, a victory over Napoleon at Laon, and, in connection with Schwartzenberg, at the close of the month, pressed forward to Paris. The day of Montmartre crowned this campaign, and, March 31, Blücher entered the capital of France. His king, in remembrance of the victory which he had gained near Wahlstadt, made him Prince of Wahlstadt, with a suitable income. In England, whither he followed the allied monarchs, in June of the same year, he was received by the people with enthusiasm. The University of Oxford conferred on him the degree of Doctor of Laws. He afterwards lived on his estates in Silesia till 1815, when the chief command was again committed to him, and he led his army into the Netherlands. June 15, Napoleon threw himself upon him, and Blücher, on the 16th, was defeated at Ligny. In this engagement his horse was killed, and he was thrown under his body. After this unfortunate yet honourable day, the true greatness of the field-marshal and his army became apparent. In the battle of the 18th Blücher arrived at the most decisive moment upon the ground, and taking Napoleon in the rear and flank, assisted materially in completing the great victory of Belle Alliance, or Waterloo (which see). He refused the proffered armistice, and forced Paris to surrender; opposing with energy, on this second conquest of the capital, the system of forbearance practised on the former occasion. As he was already a knight of all the military orders of Europe, the King of Prussia, to reward his new services, created a new order expressly for him. After the Peace of Paris the prince retired to his estates. Aug. 26, 1819, the anniversary of the battle on the Katzbach, the hero received at Rostock, his native place, an honour which is seldom bestowed in Germany. The whole body of his countrymen, the inhabitants of Mecklenburg, united to erect a monument commemorating his glory, executed by Schadow in Berlin. Blücher died, after a short illness, at his estate of Kriblowitz, in Silesia, September 12, 1819, aged almost seventy-seven years. June 18, 1826, a statue of bronze was erected to him in Berlin, 12 feet in height, modelled by Rauch, and cast by Le Quine and Reisinger.—Blücher was not so eminent for military science as for ability in action. He himself often acknowledged this, when he was praising the merits of Gneisenau, to whose assistance he was greatly indebted. In battle, however, he had the eye of a falcon. His simplicity, good nature, and bravery endeared him to his sol-

diers, who loved him like a father. His addresses and proclamations are distinguished for their brevity, precision, and simplicity, forming a striking contrast to the high-sounding French proclamations of the time. See Blücher's Lebensbeschreibung (Blücher's Life), by Varnhagen von Ense, Berlin, 1827; and Scherr's Blücher, seine Zeit und sein Leben (Blücher's Life and Times; two vols., Leipzig, 1862).

BLUE. See COLOUR.

BLUE, PRUSSIAN, a colouring matter of a pure dark-blue colour, sometimes with a bronze lustre, sometimes dull; inodorous and insipid; insoluble in water, alcohol, or ether; decomposed by caustic alkalies. The discovery of this colour was accidentally made in 1704 by Diesbach, a manufacturer of colours, who, with the intention of precipitating the colouring matter from cochineal, with which alum and vitriol of iron were dissolved, procured some alkali from the laboratory of Dippel. This alkali, which Dippel had been heating with some animal matter, produced a beautiful blue precipitate. Dippel, discovering that the alkali had acquired this power of forming a blue precipitate of iron on account of its mixture with animal oil, soon learned to prepare it in a more simple way, since animal and vegetable substances, which contain nitrogen, will give the same result. It is, however, necessary that all the materials should be perfectly pure, since the purification would be too expensive. The addition of alum gives to this blue more body and a brighter colour; but the greater the quantity, the poorer is the quality of the blue. As manufactured on the large scale, Prussian blue is not a single chemical substance, but a mixture of several definite compounds.

BLUE-BIRD, or BLUE ROBIN (*Sylvia sialis*, or *Sialia sialis*). This beautiful little bird is one of the earliest messengers of spring in America, and is occasionally seen as early as the month of February in mild seasons. The middle of March is the ordinary time of mating, when the male blue-bird is observed to be extremely devoted to the female, and shows the ardour of his attachment by every attention in his power, by the rapturous animation of his song, and the angry jealousy with which he repels the approaches of a rival. The nest of the former year is then repaired, and the female begins to lay her eggs, usually five, sometimes six, of a pale-blue colour. Two or three broods are raised in a season, the youngest of which are taken care of by the male, while the mother is still attending to the nest. The principal food of this species is insects, especially large beetles and other hard-wing or coleopterous insects to be found about dead or rotten trees: berries, persimmon, and the seeds of various plants, are also discovered in their stomachs. Large and numerous tape-worms infest their bowels, and they are also exceedingly annoyed by vermin externally. Wilson says that, in this respect, they are more plagued than any other bird except the woodcock. The spring and summer song of the blue-bird is a soft and often-repeated warble: in the month of October his song changes to a single plaintive note. About the middle of November the blue-birds disappear, though, occasionally, one or two may be seen during the winter in mild weather. The manners of this species are so gentle, and they render so much service by the destruction of insects, that they are always regarded with favour by the farmer. The male blue-bird is 6¾ inches long, with very full and broad wings. All the upper parts are of a rich sky-blue, with purple reflections; the throat, breast, and sides rich, ruddy, chestnut: the bill and legs are black. The female is easily known by the duller cast of the plumage on the back, and by the red on the breast not descending so low as in the male, and being much fainter. The blue-bird inhabits the whole of the United States, also Mexico, Brazil, Guiana, and the Bahama Islands. Wilson states that 'nothing is more common in Pennsylvania, than to see large flocks of these birds, in the spring and fall, passing at considerable heights in the air, from the S. in the former, and from the N. in the latter season. I have seen in the month of October, about an hour after sunrise, ten or fifteen of them descend from a great height, and settle on the top of a tall, detached tree, appearing, from their silence and sedateness, to be strangers and fatigued. After a pause of a few minutes they began to dress and arrange their plumage, and continued so employed for ten or fifteen minutes more; then, on a few warning notes being given, perhaps by the leader of the party, the whole remounted to a vast height, steering in a direct line for the S.W.'

BLUE-RIDGE, one of the ranges of the Alleghany or Appalachian Mountains, which extends from the river Hudson to Georgia, and intersects the state of Virginia from N.E. to S.W., dividing it into two parts, nearly equal. The great limestone valley extends along the N.W. side of this range. The most elevated summits of the Blue Ridge are the peaks of Otter (4000 feet), in Bedford county, Virginia.

BLUE-STOCKING, a pedantic female; one who sacrifices the characteristic excellencies of her sex to learning. The origin of this name in England is thus given by Boswell in his Life of Johnson: 'About this time (1780) it was much the fashion for several ladies to have evening assemblies, where the fair sex might participate in conversation with literary and ingenious men, animated with a desire to please. These societies were denominated *blue-stocking clubs*, the origin of which name was as follows:—One of the most eminent members of these societies was Mr. Stillingfleet, who always wore blue stockings. Such was the excellence of his conversation, that his absence was felt as a great loss, and it used to be said, "We can do nothing without the blue stockings;" and thus by degrees the title was established.'—The term has been adopted in both France and Germany, where *bas bleu* and *Blaustrumpf* are respectively employed with the same meaning as our blue-stocking. *Blaustrumpf* is also used to signify a spy.

BLUM, ROBERT, a noted character in connection with the cause of Liberalism in Germany, was born at Cologne in 1807, of humble parentage. He served for a short time in the army, and became subsequently connected with the Leipzig Theatre, of which he acted as secretary and treasurer. In this occupation he found leisure for cultivating his literary tastes, having long sedulously devoted himself to self-culture. He became a contributor to a journal of belles-lettres; wrote a play, The Liberation of Candia; and with Herloszsohn and Marggraff, compiled the Theatrical Lexicon (seven vols., Altenburg and Leipsig, 1839–42). About this time also he began to come prominently forward as the champion of the Liberal cause, and acquired much renown as a popular orator. On the outbreak of the commotions of 1848 he manifested great enthusiasm, and became soon the rallying-point of democracy in Saxony, and the leading member of opposition in the National Assembly at Frankfort, to which he was sent that year as member for Leipzig. As a speaker, Blum's principal characteristics were versatility, readiness, great pathetic powers, and last, not least, a magnificent stentorian voice. The events of October at Vienna inspired him with fresh energy, and he proceeded thither at the head of a deputation to express the sympathy of the German democrats in the Frankfort Assembly with the Viennese. He took an active part in the conflict of the citizens with the imperialists; but on the surrender of the capital

to Windischgrätz, was arrested with several of his companions on 4th November. Brought before a military tribunal, he pleaded in vain his privileges as a deputy from the German diet, and was condemned to be hanged, a sentence which was changed into death by the bullet. He was accordingly shot on the morning of 9th November, 1848.

BLUMENBACH, JOHANN FRIEDRICH, one of the most celebrated naturalists of modern times, born at Gotha in 1752, studied at Jena and Göttingen, and was appointed in the latter in 1776 extraordinary professor of medicine and inspector of the museum of natural history, and in 1778 ordinary professor. In 1788 he visited England, where he was received with marked distinction by George III. and his queen, and formed an intimacy with Sir Joseph Banks, Solander, and other distinguished naturalists, and in 1790 he repeated his visit. In 1812 he was appointed secretary to the Royal Society of Sciences at Göttingen, in 1816 became physician to the King of Great Britain and Hanover, in 1821 was made a knight-commander of the Guelphic Order, and in 1831 was elected a member of the Academy of Sciences at Paris. In 1825 the jubilee of his graduation as doctor was celebrated. On this occasion a medal was struck, and an endowment founded under the name of the Blumenbach Stipendium or Bursary, to assist young talented physicians and naturalists, and enable them to make scientific travels. In 1835 he retired from public life, and died January 22, 1840, at the advanced age of eighty-eight. The first work which brought him into notice was the thesis for his degree, entitled De Generis Humani Varietate Nativa, and from its publication in 1775 he continued almost for sixty years to exert a powerful influence on the progress of science, both by the number of distinguished pupils who were indebted for their first training to his admirable lectures, and by his valuable writings, partly inserted in the Transactions of scientific societies, and partly published as separate works. Among the latter, in addition to the thesis, which received important additions in subsequent editions, and may be said to have given a direction to the most important studies of his after life, are the Institutiones Physiologicæ, first published in 1787, and long a text-book in many of the most celebrated schools of Europe; the Handbuch der vergleichenden Anatomie (Handbook of Comparative Anatomy), which, though now defective in consequence of the rapid progress which has since been made, was the best work that had appeared up to its date, and even still maintains its ground as a valuable manual; and his Collectio Craniorum Diversarum Gentium. The last work, contained in seven decades published between 1790 and 1828, gives descriptions and figures of his collection of skulls, one of the most extensive in existence, and still preserved at Göttingen, though not so carefully as its value deserves. In regard to the important subject of which it treats, Blumenbach held decidedly that the human race formed only one species, and had originally descended from a single pair; but he divided it into the five varieties of Caucasian, Mongolian, Negro, American, and Malay.

BOA, the name of a genus of reptiles belonging to Cuvier's tribe of *serpents* proper, having the tympanic bone or pedicle of the lower jaw movable, which is itself almost always suspended to another bone analogous to the mastoid, attached to the skull by muscles and ligaments, which contribute to its mobility. The branches of this jaw are not united, and those of the upper jaw are attached to the intermaxillary bone only by ligaments, so that these animals can dilate the mouth sufficiently to swallow bodies larger than themselves. Their palatal arches partake of this mobility. In the species of this tribe not possessed of venom, the branches of the upper and lower jaw, throughout their entire length, as well as the palate bones, are armed with pointed, recurved, solid, and permanent teeth, forming four nearly equal rows above, and two below.

The genus Boa comprises all those serpents which, in addition to the preceding characters, have the *scuta* on the under part of the tail single; a hook on each side of the vent; the tail prehensile; the body compressed and largest in the middle, and with small scales, at least on the posterior part of the head.

The species properly belonging to this genus are among the largest of the serpent tribe, some of them, when full grown, being 30, and even 40 feet long. Though destitute of fangs and venom, nature has endowed them with a degree of muscular power which renders them terrible. Happily, they are not common in situations much frequented by mankind, but are chiefly found in the vast marshy regions of Guiana, and other hot parts of the American continent. Although sufficiently active when fasting or hungry, they become very sluggish and inert after having gorged their prey, at which time they are most easily destroyed. In order to obtain their food, the boas of largest size attach themselves to the trunk or branches of a tree, in a situation likely to be visited by quadrupeds for the sake of pasture or water. There the serpent swings about in the air, as if a branch or pendent of the tree, until some luckless animal approaches; then, suddenly relinquishing its position, swift as lightning he seizes the victim, and coils his body spirally round its throat and chest, until, after a few ineffectual cries and struggles, the animal is suffocated, and expires. In producing this effect, the serpent does not merely wreathe itself around its prey, but places fold over fold, as if desirous of adding as much weight as possible to the muscular effort: these folds are then gradually tightened with enormous force, and speedily induce death. The animals thus destroyed by the larger boas are deer, dogs, and even bullocks. The prey is then prepared for being swallowed, which the creature accomplishes by pushing the limbs into the most convenient position, and then covering the surface with a glutinous saliva. The reptile commences the act of deglutition by taking the muzzle of the prey into its mouth, which is capable of vast extension; and, by a succession of wonderful muscular contractions, the rest of the body is gradually drawn in, with a steady and regular motion. As the mass advances in the gullet, the parts through which it has passed resume their former dimensions, though its immediate situation is always betrayed by external protuberance.

As already mentioned, the species of Boa are peculiar to the hot parts of South America, though nothing is more common than the error of confounding the great serpents of India, Africa, &c., with the proper Boa. The great serpents of the old continent belong to the genus Python, and will be treated of under that title. It is nevertheless true that Pliny has spoken of the huge serpents of India, and afterwards of large serpents of Italy, which were called Boæ, the name being derived according to him from the fact of their sometimes sucking cows.

Among the most celebrated species is the *Boa constrictor*, distinguished by a large chain, formed alternately of large, blackish, irregular hexagonal spots, with pale, oval spots, notched at their two extremities, along the back. This is the largest species of the genus Boa, but several other large American serpents, whose habits are the same, are also called boas, though included in different genera. Among these are the ringed boa, which was worshipped in ancient times by the Mexicans and propitiated by human sacrifices, and the dog-headed boa. The anaconda

(which see) is also included by some in the genus Boa. The other species are of smaller size, and some do not much exceed that of the largest common snakes. We cannot reflect upon the natural history of these great reptiles, without being struck with their peculiar adaptation to the situations in which they are commonly most abundant. In regions bordering on great rivers, which, like the Orinoco, &c., annually inundate vast tracts of country, these serpents live securely among the trees with which the soil is covered, and are capable of enduring very protracted hunger without much apparent suffering or diminution of vigour. Noxious as such districts are to human life, they teem with a gigantic and luxuriant vegetation, and are the favourite haunts of numerous animals, preyed upon, and to a certain degree restricted in their increase, by the boas. As their prey come within their reach, they require no deadly apparatus of poison to produce their destruction, since nature has endowed them with muscular strength surpassing that of almost every other creature, in proportion to their size. Once fairly involved in the crushing folds of the *constrictor*, the strength of the strongest man would not prove of the slightest avail; indeed, from the ease with which larger and more powerful creatures are put to death by these serpents, it is evident that any number of unarmed men would act very unwisely to provoke a combat with enemies endowed with powers of such dreadful energy.

BOABDIL, ABU-ABDULLAH, last Moorish king of Granada, gained the throne in 1481 by expelling his father, Mulei Hassem; but being attacked by Ferdinand of Aragon, was defeated and taken prisoner. His father having resumed his crown, Ferdinand set him at liberty, and promised to assist him against his father, on condition of his agreement to become the vassal of Spain. He accepted the ignominious condition, and his father died of a broken heart. Boabdil was not permitted to reign in peace. By his tyranny he provoked the hostility of his own subjects, and Ferdinand, taking advantage of the dissensions which prevailed, laid siege to Granada. The Moors made a valiant defence, and were prepared to bury themselves under the ruins of the city, but Boabdil capitulated, and retired to a domain of the Alpujarras assigned him by the victor. When on his way he turned round to take a last look of the city, and burst into tears. 'Right, my son,' exclaimed his mother Aixa, who was standing by him, 'weep like a woman for the throne which you had not the spirit to defend as a man and a king.' Boabdil afterwards passed into Africa, and fell in battle while assisting the King of Fez in an attempt to dethrone the King of Morocco.

BOADICEA, Queen of the Iceni, in Britain, during the reign of Nero. Having been treated in the most ignominious manner by the Romans, she headed a general insurrection of the Britons, attacked the Roman settlements, reduced London to ashes, and put to the sword all strangers to the number of 70,000. Suetonius, the Roman general, defeated her in a decisive battle, and Boadicea, rather than fall into the hands of her enemies, put an end to her own life by poison. This conflict took place A.D. 62.

BOARD OF TRADE, a department of the British government, the president of which is a member of the cabinet. Its duties are various, and are ever increasing. It is divided into six departments, each with its separate staff. There is, first, the Commercial Department, which is rather deliberative than administrative. Its duty is to advise the Treasury, the Colonial Office, and the Foreign Office on matters relating to tariffs and burdens upon trade; to superintend the business under the acts relating to the inspection of alkali works, the registration of designs, copyright of designs, art-unions, industrial exhibitions, and the collection and publication of cotton statistics. It also includes the Standard Weights and Measures Office as one of its subdepartments. Secondly, there is the Statistical Department, which has to prepare the official volumes of statistics which are periodically issued. It may also be required to prepare special statistical returns for the information of members of Parliament, chambers of commerce, or private persons who have occasion to apply to the department. It falls to this department to keep a register of foreign tariffs on British produce and manufactures. Thirdly, there is the Railway Department. It is largely occupied with arbitrating, appointing arbitrators and umpires, and performing under acts of Parliament various duties of a semi-judicial or semi-legislative character; but it has also to keep a register of joint-stock companies, and the accounts of insurance companies, and to prepare provisional orders relating to gas and water companies, as well as for the making of tramways. Fourthly, the Harbour Department exercises the supervision over lighthouses committed to the Board of Trade by act of Parliament. It has a certain control over pilotage, and discharges all the functions of government relating to the sea-fisheries of Great Britain, including the preparation of draught orders for oyster and mussel fisheries. It also prepares provisional orders under the General Pier and Harbour Acts. Fifthly, the Marine Department has to see to the registration and discipline of merchant ships, to watch over the mercantile marine offices, to take measures for the prevention of crimping, and to see that the regulations with regard to the engagement of seamen and apprentices are carried out; to examine officers, and make investigations into misconduct and wrecks; and generally to take in hand most of the business thrown upon the board by the various Merchant Shipping Acts. The department has, jointly with the Admiralty, the management of the Royal Naval Reserve. The General Register and Record Office of Seamen is a separate office belonging to this department. Sixthly, the Financial Department was established in 1851, when it was found necessary to wind up the Merchant Seamen's Fund; and various branches of business have been added, the most important being the management of the lighthouse and other accounts connected with the Mercantile Marine Fund. This department has not only to keep the accounts, but to control receipt and expenditure in the various branches of business superintended by it. It has to deal with Greenwich pensions, seamen's savings-banks and money-orders, the proper distribution of the effects of seamen dying abroad, and the like.

BOAT, properly, a vessel propelled by oars. In a more extensive sense the word is applied to other small vessels, which differ in construction and name according to the services in which they are employed. Thus they are light or strong, sharp or flat bottomed, open or decked, &c., according as they are intended for swiftness or burden, deep or shallow water, &c. —The *long-boat* or *launch*, is the largest boat belonging to a ship, generally furnished with sails, and is employed for cruising short distances, bringing heavy articles on board, &c.—The *barge* is the next in size, but of slighter frame, and intended for carrying the commanding officers to and from the ship. It is likewise a vessel or boat of state furnished and equipped in the most sumptuous style. The word is also applied to capacious boats of burden used on canals and rivers.—The *pinnace* resembles a barge, but is smaller.—The *cutters* of a ship are broader and deeper than the barge or pinnace, and are employed

in carrying light articles, passengers, &c., on board. —*Yawls* are used for similar purposes, and are smaller than cutters.—A *gig* is a long, narrow boat, used for expedition, and rowed with six or eight oars. —The *jolly-boat* is smaller than a yawl, and is used for going on shore.—A *wherry* is a light, sharp boat, used in a river or harbour for transporting passengers. —A *punt* is a flat-bottomed boat, chiefly used for one person to go on shore from small vessels.—A *skiff* is a small boat like a yawl, used for passing rivers.—A *Moses* is a flat-bottomed boat, used in the West Indies for carrying hogsheads from the shore to ships in the roads.—A *felucca* is a small vessel with six or eight oars, frequent in the Mediterranean; its helm may be applied in the head or stern as occasion requires. Also, a narrow-decked galley-built vessel in great use there, of one or two, sometimes even three, masts, and carrying lateen sails.—*Scow* is an American word, signifying a large, flat-bottomed, heavy boat, about 30 feet long and 12 wide. In some parts of the United States it is called a *gondola*. See CANOE, GALLEY, &c.

BOBBIN-NET. See LACE.

BOCCACCIO, GIOVANNI, whose name alone, as Mazzuchelli justly says, is equivalent to a thousand encomiums, was the son of a Florentine merchant. His family came originally from Certaldo, a village in Tuscany; whence he gives himself the appellation *da Certaldo*. He was the offspring of an illicit connection which his father formed while on a visit of business at Paris, and was born in that city, 1313. He early removed to Florence, where he began his studies, and even in childhood discovered a decided fondness for poetry. In his tenth year his father put him under the care of a merchant, to be educated in his business. With him he returned to Paris, and remained there six years without acquiring any fondness for his profession. His residence of eight years at Naples was equally ineffectual to this purpose. Instead of attending to trade, he formed the closest intimacy with several learned men of Florence and Naples, who had been drawn thither by that patron of the arts, King Robert. There is nothing to prove that he shared in the favour of the prince; but he enjoyed the particular affection of a natural daughter of his, for whom he composed many pieces in prose and verse, and to whom he often pays homage under the name of Fiammetta. Placed in fortunate circumstances, with a lively and cheerful disposition, of a soft and pleasing address, the favoured lover of a king's daughter, he regarded with more aversion than ever the station for which he had been intended. The fondness of the princess for poetry; his own intimacy with scientific and literary men; the tomb of Virgil, near Naples, which he used to visit in his walks; the presence of Petrarch, who was received with the highest distinction at the court of Naples, and who went from that city to Rome to be crowned with the poetic laurel; the intimacy which had arisen between the two poets—all operated powerfully on Boccaccio to strengthen and fix his natural inclination for poetry and literature. After living two years at Florence with his father he returned to Naples, where he was very graciously received by the Queen Joanna. It is thought that it was no less to gratify the young queen than his Fiammetta that he wrote his Decameron, which has raised him to the rank of the first Italian prose-writer. On the death of his father, becoming master of his own inclinations, he settled at Florence, where his first work was a description of the plague, which forms the opening of the Decameron. He afterwards wrote the life of Dante. He was chosen to inform Petrarch, at Padua, of his recal from exile, and the restoration of the property belonging to his father, who had died during his absence. The friendship of these two men of genius continued for life. When Boccaccio, some years after, had exhausted his fortune in the purchase of costly books, and in expensive pleasures, he found in Petrarch the most generous assistance—the wise counsels of his friend were now as beneficial to his morals as they had been to his writings; in fact, to him he was indebted for the change which took place in his character. A dying Carthusian had persuaded him to renounce all the pleasures of the world; Petrarch softened his determination, and brought him back to that proper medium which marks the truly wise man. New troubles in Florence induced him to retire to Certaldo, where he owned a small estate. There he prosecuted his labours in tranquillity. He now composed several historical works in Latin. Among these is the first modern work which contains, in a collected form, the mythological notices which are scattered in the writings of the ancients. He was well versed in Greek, and had, at his own expense, brought Leontius Pilatus of Thessalonica from Venice to Florence, and maintained him three years at his house, in order to learn Greek of him, and to have his assistance in explaining the poems of Homer and translating them into Latin. He was the first who procured copies of the Iliad and Odyssey from Greece at his own expense, and spared neither cost nor trouble to obtain good Greek and Latin manuscripts. At the same time, he used all his influence to excite his contemporaries to learn the Greek language, and substitute the study of the ancients for that of the scholastic philosophy. The reputation which he had gained twice procured for him important missions to Pope Urban V. Having fulfilled these, he returned to Certaldo and resumed his studies. Here he was attacked by a severe and lingering disorder, which finally left him in a state of debility as painful as the disease itself. Upon his recovery he was charged with a difficult but very flattering trust. Dante had always been the object of his highest admiration. The Florentines, who had once persecuted and banished that illustrious poet, but now did justice to his merits, had resolved, by way of atonement to his memory, to establish a public professorship for the illustration of his poems, which were every day becoming more obscure as the distance of the time when they were written became greater. This new professorship was conferred upon Boccaccio, who devoted himself to it with so much ardour that his health could never be firmly re-established. This received a further shock from the death of his instructor and dearest friend Petrarch. He survived him not much more than a year, and died at Certaldo December 21, 1375. On his tomb was placed this inscription, composed by himself:

> 'Hac sub mole jacent cineres ac ossa Joannis,
> Mens sedet ante Deum meritis ornata laborum
> Mortalis vitæ. Genitor Bocchaccius illi,
> Patria Certaldum, studium fuit alma poesis.'

Boccaccio appears, in all his works, to be a poet of the richest invention, the most lively imagination, and the tenderest and warmest feeling. In prose, he is a perfect master of composition. His Decameron, which contains a collection of a hundred tales, partly borrowed from the Provençal poets, is the work on which his fame chiefly rests. In this he painted, as it were, on one vast canvas, men of all ranks, characters, and ages, and incidents of every kind, the most extravagant and comical, as well as the most touching and tragic; and improved the Italian language to a degree of excellence never before attained. Of his other works we will mention only the following: La Teseide, the first attempt towards an Italian epic, and written in *ottava rima*, of which Boccaccio is con-

sidered the inventor; Amorosa Visione, a long poem in *terza rima* (the initial letters of which form two sonnets and a canzonet, in praise of the Princess Maria, his mistress, whom he here ventures to address by her proper name); Il Filostrato, a romantic poem in *ottava rima;* Nimfale Fiesolano, in the same measure; Rime (most of his sonnets, canzonets, and other amatory poems, he consigned to the flames, after reading the Italian poems of Petrarch; those which remain appear to have been preserved against his will); Il Filocopo, ovvero amorosa Fatica, a hunting romance; L'amorosa Fiammetta, a charming tale; L'Urbano (thought by some to be spurious); L'Ameto ossia Nimfale d'Ameto, a mixed composition, partly in prose, and partly in verse; Il Corbaccio, ossia Laberinto d'Amore, a pungent satire against a lady who had offended him; and, finally, Origine, Vita e Costumi di Dante Alighieri, a work interesting for the characteristic traits which it records; and his Commento sopra la Commedia di Dante, which, however, is carried no farther than the seventeenth canto of Dante's Hell. His Latin works are, De Genealogia Deorum, Libri xv.; De Montium, Lacuum, Sylvarum, Fluviorum, Stagnorum et Marium Nominibus Liber; De Casibus Virorum et Feminarum illustrium, Libri iv.; De claris Mulieribus; and Eclogæ.—A new critical edition of the Decameron, with an historical literary commentary, and the life of Boccaccio, was published at Paris, 1823, in five vols. —In the ducal library at Florence, among the manuscripts collected by the celebrated Maglisbecchi, Professor Sebast. Ciampi discovered a memorandum-book of Boccaccio, containing a record of his studies and some curious circumstances relating to himself and a number of his distinguished contemporaries. It was published at Florence in 1827.

BOCCAGE, Marie Anne du, a celebrated French poetess, member of the Academies of Rome, Bologna, Padua, Lyons, and Rouen, was born in Rouen, 1710, died 1802. She was educated in Paris, in a nunnery, where she discovered a love of poetry. She became the wife of a receiver of taxes in Dieppe, who died soon after the marriage, leaving her a youthful widow. She concealed her talents, however, till the charms of youth were past, and first published her productions in 1746. The first was a poem on the mutual influence of the fine arts and sciences. This gained the prize from the Academy of Rouen. She next attempted an imitation of Paradise Lost, in six cantos; then of the Death of Abel; next, a tragedy, the Amazons; and a poem in ten cantos, called the Columbiad. Madame du Boccage was praised by her contemporaries with an extravagance for which only her sex and the charms of her person can account. *Forma Venus, arte Minerva,* was the motto of her admirers, among whom were Voltaire, Fontenelle, and Clairaut. She was always surrounded by distinguished men, and extolled in a multitude of poems, which, if collected, would fill several volumes. There is a great deal of entertaining matter in the letters which she wrote on her travels in England and Holland, and in which one may plainly see the impression she made upon her contemporaries. Her works have been translated into English, Spanish, German, and Italian.

BOCCANERA, Simone, the first doge of Genoa, was born of an illustrious noble family, but early took part with the democratic party, and gained great popularity by undertaking the defence of the people against the nobles. During a commotion caused by the severity with which Philip of Valois had punished a mutiny on board some Genoese galleys in the service of France, the people wished to appoint Boccanera their abbé, an office which appears to have been similar to that of the tribunes at Rome. Boccanera declined to accept, on the ground that his noble birth would not allow him to become a plebeian magistrate. The excuse only made the people more determined to place him at their head; and as he would not be abbé, they by acclamation hailed him doge. The office thus introduced for the first time into Genoa, in 1339, was exercised by Boccanera till 1344, when the ascendency of a faction opposed to him obliged him to abdicate and retire to Pisa. He afterwards regained the office in 1356, and had held it for seven years when his enemies succeeded in destroying him by poison.

BOCCHERINI, Luigi, a celebrated composer of instrumental music, was born in 1740, at Lucca, and received from the Abbot Vanucci, music-master of the archbishop, his first instruction in music and on the violoncello. He further improved himself in the art at Rome, and afterwards went, with Filippo Manfredi, his friend and countryman, to Spain, where he was loaded with honours and presents by the king, and was appointed by the Academy to furnish nine pieces of his composition annually, which he continued to do till his death in 1805. The King of Prussia, Frederick William II., who was a great lover of the violoncello, and admired Boccherini's compositions, settled upon him a considerable pension, on condition of his sending him yearly some of his quartets and quintets. The compositions which Boccherini has published himself consist of symphonies, sestets, quintets, quartets, trios, duets, and sonatas for the violin, violoncello, and piano-forte. He never composed anything for the theatre; and of church compositions we find but one, his Stabat Mater. The adagios of Boccherini excited the admiration of the connoisseurs and the despair of the composers of his time. He may be regarded as the precursor of Haydn, as he was the first who wrote instrumental quartets, of which all the parts are *obligato,* and determined the true character of this species of music. His melodies are more highly esteemed in France and Spain than in Germany.

BOCCHETTA, a narrow pass of the Apennines, leading from Lombardy to Genoa. It is defended by three fortifications. In the Austrian War of Succession (1746 and 1747), and in the French war, towards the end of the eighteenth century, it was the scene of several important events.

BOCHART, Samuel, descended from an illustrious family, though only the son of a Protestant minister, was born at Rouen in 1599, and gave proof of precocious talent by composing at the age of fourteen a Greek poem in praise of his master, Thomas Dempster, who was so much pleased with it that he published it at the head of his work on Roman Antiquities. He afterwards studied philosophy and theology at Sédan, visited London and Leyden, and returning to France about 1628, became Protestant minister of Caen. Shortly after, a Jesuit of the name of Veron, who had been specially trained to controversy, and had received a diploma entitling him to travel the country and debate the points of difference between the Protestant and the Romish churches, challenged Bochart to a discussion. It took place in 1629, in the castle of Caen, in presence of the Duke of Longueville, governor of Normandy, and a large assemblage of nobility and gentry, and had continued for eleven days, when Veron, without waiting to bring it to a close, judged it prudent to take his departure. The debate was published by Bochart under the title of Actes de la Conférence tenue à Caen. His next work, entitled Geographia Sacra seu Phaleg et Chanaan, added so much to his reputation that Christina, queen of Sweden, sent him a letter in her own hand, inviting him to Sweden. He accepted the invitation, and had for his travelling companion the celebrated Huetius, afterwards Bishop of Avranches, and author

of an excellent work on the Christian evidences, entitled Demonstratio Evangelica. On his return to Caen in 1653, he learned that an academy had been founded there in his absence. He immediately joined it, and was afterwards one of its most distinguished members. Bochart's next great work is entitled Hierozoicon, or an Account of the Animals mentioned in Scripture. It was published in 1661, and was scarcely completed when its distinguished author, while addressing the academicians of Caen, was struck with apoplexy and died almost instantaneously. His health had previously given way under grief for the loss of a daughter, his only child. Besides the works above mentioned, he wrote several others, among which is a Letter to Dr. Morley, written, it is said, at the request of King Charles II., and discussing three important questions—De Presbyteratu et Episcopatu; De Provocatione a Judiciis Ecclesiasticis; De Jure et Potestate Regum. Bochart's principal works are still standards on the subjects of which they treat.

BOCHNIA, a town, Austria, in Galicia, in the government of Lemberg, near the Raba, 25 miles E.S.E. of Cracow. It is tolerably well built, with several churches, a gymnasium, a grammar and other schools, and a board for the regulation of mines and saltworks. The salt mines here employ 500 persons, and yield about 15,000 tons per annum. Pop. 5500.

BÖCKH, Augustus, the most learned student of antiquity of the present century, was born at Karlsruhe, Nov. 24, 1785. In 1803 he entered the University of Halle, where he was induced by the influence of Wolf to devote himself to the study of philology. After spending three years here, and more than a year at Berlin, he returned in 1807 to his native state, and in the same year became extraordinary, and two years later ordinary professor in the University of Halle. He had already acquired such renown as a scholar, that in 1810 he was offered the chair of rhetoric and ancient literature in the newly-founded University of Berlin; and here he remained enjoying this and other important offices and dignities for the rest of his life. The works of Böckh have made an epoch in the history of philology and archæology. In his studies of classical antiquities he set forth the principle that philology ought to be an historical method intended to reproduce the whole social and political life of any given people during a given period; and in accordance with this he divided the science into two parts: 1st, Hermeneutics and Criticism; 2d, the Practical and Theoretical Life of the Ancients. His views were vigorously attacked in various quarters, but the majority of German scholars gathered round him, and he himself carried his views into effect in a number of important works. The most remarkable of these are the following:—1st, an edition of Pindar (two vols. Leipzig, 1811–22); 2d, Die Staatshaushaltung der Athener (The Public Economy of the Athenians, two vols. Berl. 1817), which has been translated into English; 3d, Metrologische Untersuchungen über die Gewichte, Münzfusse und Maasse des Alterthums (Metrological Investigations of the Weights, Coins, and Measures of Antiquity, Berl. 1838); and 4th, Urkunden über das Seewesen des attischen Staats (Documents concerning the Maritime Affairs of Attica, Berl. 1840). Besides these he was uninterruptedly engaged from 1815 to the end of his life in making a collection of Greek inscriptions, which he published with the title Corpus Inscriptionum Graecarum, and the first four volumes of which appeared at Berlin between 1824 and 1862. The first three volumes of a collection of his minor works, edited by Ascherson, appeared during the lifetime of the author (Leipzig, 1856–66). Böckh died at Berlin, 3d Aug. 1867.

BOCKING, a village in England, county Essex, situated on a gentle acclivity on the Blackwater, a little N. from Braintree, with which it forms a continuous town, though in a different parish. The only buildings of any note are the parish church, the Independent and Wesleyan chapels, and the union workhouse. There are several schools and a literary and mechanics' institute. Bocking was formerly celebrated for its baize manufacture; this has now, however, been superseded by the silk trade, which is carried on to a great extent, the weaving of silks, satins, and velvets employing many hundred hands. Pop. 3399.

BODE, John Elert, an astronomer, born at Hamburg, 1747. He gave the first public proof of his knowledge by a short work on the solar eclipse of August 5, 1766. The approbation which this received encouraged him to greater labours, and in 1768 appeared his Introduction to the Knowledge of the Starry Heavens (ninth edition, 1822). In 1772 the Berlin Academy chose him their astronomer, and ten years afterwards he was made a member of that institution. His best works are his Astronomical Almanac (commencing 1774)—a work indispensable to every astronomer—and his large Celestial Atlas (Himmelsatlas) in twenty sheets, in which the industrious editor has given a catalogue of 17,240 stars (12,000 more than in any former charts). In 1825 he was released, at his own wish, from his duties in the Academy of Science and the observatory in Berlin. His place was filled by Professor Encke. He died in 1826. His empirical law as to the distance of the planets is well known.

BODIN, Jean, a political writer of the sixteenth century, was born in 1530 or 1529 at Angers; studied law at Toulouse; delivered lectures on jurisprudence there, and afterwards went to Paris and practised. Being unsuccessful in his profession, he turned his talents to literary labours; was invited by Henry III. to his court; and afterwards travelled with the king's brother, Francis, duke of Alençon and Anjou, to Flanders and England, where he had the gratification of hearing lectures in Cambridge on his work De la *République*, originally written in French, but afterwards translated by Bodin himself into Latin. He died, 1596, at Laon, of the plague.

BODLEIAN LIBRARY. See Libraries.

BODLEY, Sir Thomas, the founder of the Bodleian Library at Oxford. He was born at Exeter in 1544, and educated partly at Geneva, whither his parents, who were Protestants, had retired in the reign of Queen Mary. On the accession of Elizabeth they returned home, and he completed his studies at Magdalen College, Oxford. He afterwards became a fellow of Merton College, and read lectures on the Greek language and philosophy. He went to the Continent in 1576, and spent four years in travelling. He was afterwards employed in various embassies to Denmark, Germany, France, and Holland. In 1597 he returned home, and dedicated the remainder of his life to the re-establishment and augmentation of the public library at Oxford. This he accomplished, procuring books and manuscripts himself, both at home and abroad, at a great expense, and by his influence and persuasion inducing his friends and acquaintances to assist in his undertaking. Sir Robert Cotton, Sir Henry Savile, and Thomas Allen, the mathematician, were among the principal contributors on this occasion. The library was so much augmented that Sir Thomas Bodley, who was knighted at the accession of James I., was induced to erect an additional structure for the reception of the increasing quantity of valuable books and manuscripts. He died in London, 1612, and was interred in the chapel of Merton College, in the university. He bequeathed

nearly the whole of his property to the support and augmentation of the library, which has been so much enriched by subsequent benefactions that it is at present one of the most magnificent institutions of the kind in Europe. See Reliquiæ Bodleianæ (London, 1703).

BODMER, John Jacob, a celebrated German poet and scholar, born at Greifensee, near Zürich, July 19, 1698. Although he produced nothing remarkable of his own in poetry, he helped to open the way for the new German literature in this department. He was the antagonist of Gottsched in Leipzig, who aspired to be the literary dictator of the day, and had embraced the French theory of taste, while Bodmer inclined to the English. He has the honour of having had Klopstock and Wieland among his scholars. Bodmer was for a long time professor of history in Switzerland. He was a copious and indefatigable writer, entertained many incorrect views, but was of service, as we have already said, to the German literature, which was then in a low and barbarous state. He died at Zürich, 1783.

BODMIN, a town, England, county Cornwall, and nearly in its centre, chiefly on the slope of a hill, 26 miles N.W. of Plymouth, consists of three principal streets, and is well and substantially built. The church, erected about the middle of the fifteenth century, and situated at the E. end of the town, is the largest and, in the interior, the handsomest in the county. Here are also several Dissenting chapels, National and other schools, a literary institute, and a dispensary. In 1839 the holding of the county sessions and assizes was transferred to Bodmin from Launceston. Pop. of mun. bor. in 1871, 4672; of parl. bor., 6758.

BODONI, Giambattista, superintendent of the royal press at Parma, chief printer of his Catholic majesty, member of several academies of Italy, knight of several high orders, was born 1740 at Saluzzo in Piedmont, where his father owned a printing establishment. He began, while yet a boy, to employ himself in engraving on wood. His labours meeting with success, he went in 1758 to Rome, and was made compositor for the press of the Propaganda. By the advice of the superintendent he made himself acquainted with the oriental languages, in order to qualify himself for the kind of printing required in them. He thereby enabled himself to be of great service to this press by restoring and putting in place the types of several oriental alphabets which had fallen into disorder. The infant Don Ferdinand about 1766 had, with a view of diffusing knowledge, established a printing-house in Parma, after the model of those in Paris, Madrid, and Turin. Bodoni was placed at the head of this establishment, which he made the first of the kind in Europe, and gained the reputation of having far surpassed all the splendid and beautiful productions of his predecessors in the art. The beauty of his type, ink, and paper, as well as the whole management of the technical part of the work, leaves nothing for us to wish; but the intrinsic value of his editions is seldom equal to their outward splendour. His Homer is a truly admirable and magnificent work; indeed, his Greek letters are the most perfect imitations that have been attempted in modern times of Greek manuscript. His splendid editions of Greek, Latin, Italian, and French classics are highly prized. He died at Padua November 29, 1813.

BOECE, Boëis, or Boyce, Hector, one of the earliest Scottish historians, was born at Dundee about 1465, and was descended from a family of landed proprietors. The family surname probably corresponds with the modern Boyce. Boece studied first at Dundee, and then at the University of Paris, where he took the degree of B.D., and became professor of philosophy in the College of Montaigu. Here he became acquainted with Erasmus, who professed a high esteem for him. About 1500 Boece quitted Paris to assume the principalship of the newly founded university of King's College, Aberdeen. He had associated with him as sub-principal William Hay, his fellow-student in France and Scotland, and his brother as professor of canon law. His revenue as principal was 40 marks. He was also made a canon of Aberdeen. The death of his patron in 1514 occasioned his first work—a history of the prelates of Mortlach (the original see) and Aberdeen, including the life of Bishop Elphinstone, which occupies about a third of the volume. It was published in Paris in 1522 under the title Episcoporum Murthlacensium et Aberdonensium per Hectorem Boetium Vitæ. This rare volume has been reprinted by the Bannatyne Club. One of Boece's characteristics, the love of completeness, appears in this work. With very scanty materials he begins it from the earliest period, and carries it down to Gavin Dunbar, the living occupant of the see. Five years afterward appeared the work on which his fame chiefly rests, the History of Scotland. The first edition is without date, but a commendatory epistle bears date 1527. Its title is Scotorum Historiæ a prima gentis origine, cum aliarum et rerum et gentium illustratione non vulgari, &c. It is written, like his previous work, in Latin. The quality in which Boece excels as a writer is one not altogether useless to an historian, but very liable to prove a snare to him, imagination. He not only made free use of the fabulous chronicles of Fordun, but filled them out with new details where they were insufficient for his purpose. He is even accused of having sometimes invented the authorities he cites. The faults which would condemn a modern historian must not be viewed with equal severity at the dawn of literature, and Boece was not without compensating merits. His style as a writer is elegant, and he undoubtedly contributed much to the advancement of learning in his native country. He is also distinguished by a patriotic zeal to magnify the achievements of his countrymen, and by an enlightened love of political liberty in advance of the age in which he lived. The first edition of the history contains seventeen books; another edition published in 1574, with additions by Ferrerius, contains an eighteenth and part of a nineteenth. In 1527 Boece received an annual pension of 50 pounds (Scots), which was to be continued 'until the king should promote him to a benefice of 100 marks Scots of yearly value.' The pension was paid till 1534, when it is supposed he received the promotion—a very unsafe inference. The rectorship of Tyrie, which he held at his death, is, however, supposed to have been the promotion in question. His death is supposed to have occurred in 1536, when a successor was appointed to this benefice.

BOEHME, or Boehm, Jacob, one of the most renowned mystics of modern times, born in 1755 at Altseidenberg, a village in Upper Lusatia, near Görlitz; died in 1624. Boehme being the son of poor peasants, remained to his tenth year without instruction, and employed in tending cattle. The beautiful and sublime objects of nature kindled his imagination, and inspired him with a profound piety. Raised by contemplation above his circumstances, and undisturbed by exterior influences, a strong sense of the spiritual, particularly of the mysterious, was awakened in him, and he saw in all the workings of nature upon his mind a revelation of God, and even imagined himself favoured by divine inspirations. The education which he received at school, though very imperfect, consisting only of writing, spelling,

and reading the Bible, supplied new food for the excited mind of the boy. He became afterwards a shoemaker; and this sedentary life seems to have strengthened his contemplative habits. In 1594 Boehme became a master shoemaker in Görlitz, married, and continued a shoemaker during his life. Boehme withdrew himself more and more from the world. If we take into view his retirement, his piety, his rich and lively imagination, his imperfect education, his philosophical desire for truth, together with his abundance of ideas, and his delusion in considering many of those ideas as immediate communications of the Deity, we have the sources of his doctrine and his works. His first work appeared in 1616, and was called Aurora. It contains his revelations on God, man, and nature. This gave rise to a prosecution against him; but he was acquitted, and called upon from all sides to continue writing. He did not, however, resume his pen until 1619. One of his most important works is Description of the Three Principles of the Divine Being. His works contain profound and lofty ideas, mingled with many absurd and confused notions. Abraham von Frankenberg (who died in 1652), his biographer and admirer, has also published and explained his writings. The first collection of them was made in Holland in 1675 by Henry Betke; a more complete one in 1682 by Gichtel (ten vols., Amsterdam), from whom the followers of Boehme, a religious sect highly valued for their silent, virtuous, and benevolent life, have received the name *Gichtelians*. Another edition appeared in Amsterdam in 1730 under the title Theosophia Revelata, two vols. 4to; the most complete in six vols. In England, also, Boehme's writings have found many admirers. William Law published an English translation of them, two vols. 4to. A sect, taking their name from Boehme, was likewise formed in England, and in 1697 Jane Leade, an enthusiastic admirer of his, established a particular society for the explanation of his writings, under the name of the Philadelphists.

BOEHMERIA, a genus of dicotyledonous plants of the order Urticaceæ, closely resembling the common stinging nettle. The genus is called after Boehmer, the German naturalist. The Boehmerias grow chiefly in the intertropical regions; there are many varieties growing in various parts of India, China, Siam, &c. The fibres of many species are tenacious, and capable of being used for manufacturing purposes. *Boehmeria nivea* is the plant commonly used in China for the extraction of the fibre called China grass, from which a beautiful cloth is woven. The Chinese cultivate it with care. They call it *chou ma*. This plant, under the Malay name of *ramee*, is now cultivated to some extent in the United States, and its fibre is becoming an article of commerce. The fibres of other species are coming more into use as they become better known. They grow wild in many districts, and are capable of rendering important service to commerce and to the industry of the countries which produce them. They yield materials suitable for a great variety of purposes, resembling in extent the uses of flax and hemp. The East India Company had their attention directed to them early in the century, but till recently they had fallen into neglect. A patent for the preparation of the fibre was obtained in Britain in 1849. *Boehmeria puya*, a native of the upper districts of India, has long been extensively used there. The plant is herbaceous, and grows to a considerable height, sometimes from 6 to 8 feet. The leaves are dark-green above, and silver-white below. They are serrated, but do not sting.

BŒOTIA, a country of ancient Greece, bounded N. by Phocis and the country of the Opuntian Locrians; E. by the Euripus, or Strait of Eubœa; S. by Attica and Megaris; and W. by the Alcyonian Sea and Phocis. Its surface is estimated at 1119 square miles; but the boundaries were not always the same. In the N. it is mountainous and cold, and the air is pure and healthy, but the soil is less fertile than that of the other portion, which, however, is infested by unhealthy vapours. The mountainous part in the N. was called in earlier times *Aonia*. Among the mountains of Bœotia are several remarkable in history and mythology—Helicon (now *Zagora*), the mountain of the Sphinx, the Teumessus, Libethrium, and Petrachus. Hypatus (modern name *Samata*) bounded the Theban plain on the E. The principal lake is Copais, the country round which is a valley completely surrounded by hills, and connected with the Eubœan Sea by subterranean passages. The lake is fed by the Cephisus, the largest river in the country, and the water is liable to accumulate more rapidly than the natural drainage of the country can carry it off. Hence the early inhabitants suffered much from inundations, and at a period previous to historical annals subterraneous channels were built to carry off the water, which indicate a very early civilization, being recognized from the ruins of them which still remain as among the greatest works of antiquity. These works made Bœotia one of the most fertile districts of Greece. Artificial drainage is said now to be neglected, to the great disadvantage of the country.—The chief occupation of the inhabitants was agriculture and the raising of cattle. Bœotia was first occupied by Pelasgian tribes. In the time of Bœotus (son of Itonus, and grandson of Amphictyon, from whom it is said to have derived its name) these were subject to the Hellenes. It was divided into small states, until Cadmus the Phœnician founded the government of Thebes. In later times all Greece worshipped the Hercules of Thebes. After the death of Xanthus, king of Thebes, most of the cities of Bœotia formed a kind of republic, of which Thebes was the chief city. Epaminondas and Pelopidas raised Thebes for a time to the highest rank among Grecian states. In Bœotia are several celebrated ancient battlefields, viz. Platæa (now the village *Kokla*), where Pausanias and Aristides established the liberty of Greece by their victory over the 300,000 Persians under Mardonius; Leuctra (now the village *Parapogia*), where Epaminondas checked the ambitious Spartans; Coronea, where the Spartan Agesilaus defeated the Thebans; and Chæronea (now *Capranu*), where Philip founded the Macedonian greatness on the ruins of Grecian liberty. Near Tanagra, the birthplace of Corinna, the best wine was produced; here, also, cocks were bred of remarkable size, beauty, and courage, with which the Grecian cities, passionately fond of cock-fighting, were supplied. Refinement and cultivation of mind never made such progress in Bœotia as in Attica. The Bœotians were vigorous, but slow and heavy. Several Thebans, however, were worthy disciples of Socrates, and Epaminondas distinguished himself as much in philosophy as by his military talents. The people were particularly fond of music, and excelled in it. They had also some great poets and artists. Hesoid, Pindar, the poetess Corinna, and Plutarch, were Bœotians.

BOERHAAVE, HERMANN, one of the most celebrated physicians of the eighteenth century, was born Dec. 13, 1668, at Woorhout, near Leyden; died 23d Sept. 1738. Boerhaave received from his father a liberal education. In 1682 he was sent to Leyden to study theology. Here he gave, at the age of twenty, the first public proof of his learning and eloquence. In 1678 he received a gold medal from the city for an academic oration, in which he attacked the doctrines

of Spinoza. In 1689 he received the degree of Doctor of Philosophy, and maintained an inaugural dissertation, De Distinctione Mentis a Corpore, in which he attacked Epicurus, Hobbes, and Spinoza (Leyden, 1690). He now commenced, at the age of twenty-two, the study of medicine. Drelincourt was his first and only teacher. From him he received only a little instruction; and by his own solitary study he learned a science on which he was afterwards to exert so important an influence. His first study was anatomy, which he pursued from books rather than from observation. He attended dissections, indeed, but his writings show a deficiency of practical knowledge. Still he exercised a salutary influence on the study of anatomy, as the use he made of mechanical illustrations induced anatomists to apply themselves to a more accurate study of the forms of the organs. After this preliminary study, Boerhaave read all the works, ancient and modern, on medicine, in the order of time, proceeding from his contemporaries to Hippocrates, with whose superior excellence and correct method he was forcibly struck. He also studied botany and chemistry, and although still preparing himself for the clerical profession, was made in 1693 Doctor of Medicine at Harderwyck. His dissertation was De Utilitate Explorandorum Excrementorum in Ægris, ut Signorum. After his return to Leyden, some doubts being raised as to his orthodoxy, he finally determined to follow the profession of medicine. In 1701 the University of Leyden chose him, on the death of Drelincourt, to deliver lectures on the theory of medicine; on which occasion he pronounced his dissertation De Commendando Studio Hippocratico. In this he eulogizes the method of Hippocrates, which was that of experimental philosophy, to which Bacon had recently recalled the scientific world, but to which Boerhaave himself did not always adhere. Boerhaave now began to develop those great and peculiar excellences which make him a pattern to all who undertake the office of instruction. Pupils crowded from all quarters to hear him. In 1703 he delivered another dissertation, De Usu Ratiocinii Mechanici in Medicina (Leyden, 1703). In this he began to deviate from the Hippocratic method, and to introduce the first principles of a defective system, to which his eminent talents gave afterwards exclusive currency. His method was eclectic, combining the speculations of opposing schools, and led him to attach too much importance to mechanical and chemical theories of vital actions. In 1709 the University of Leyden appointed him successor to Hotton, in the chair of medicine and botany. On this occasion he delivered a dissertation, Quâ Repurgatæ Medicinæ facilis asseritur Simplicitas, which deserves to be placed by the side of those in which he recommends the study of Hippocrates. The course of instruction to which Boerhaave was now devoted, induced him to publish two works, on which his fame still rests, viz.: Institutiones Medicæ in Usus Annuæ Exercitationis Domesticos; and Aphorismi de Cognoscendis et Curandis Morbis in Usum Doctrinæ Medicinæ. In the former, which is a model of comprehensive erudition and clear method, he unfolds his system in its fullest extent; in the latter he undertakes the classification of diseases, and discourses separately on their causes, nature, and treatment. The professorship of botany, which he also filled, contributed no less to his reputation. He rendered essential services to botany by his two catalogues of plants in the garden of Leyden, the number of which he had very much increased. We are indebted to him for the description and delineation of several new plants, and the introduction of some new species. In 1714 he was made rector of the university, and at the close of his term of office delivered an oration, De Comparando certo in Physicis, one of his best pieces. At the end of this year he succeeded Bidloo in the chair of practical medicine, which he occupied for more than ten years. In this office he had the merit of introducing clinical instruction, that is, of lecturing to his students at the bedside of patients in hospital, for the first time in Europe. Busily occupied as he already was, the university conferred on him, at the death of Lemort, the professorship of chemistry, which science he had taught since 1703. His Elements of Chemistry is one of his finest productions, and notwithstanding the entire revolution which has taken place in this branch of science, is still highly valuable. His experiments are remarkable for their accuracy. The part which treats of organic bodies is exceedingly good for that period. So extensive a sphere of action gained for Boerhaave a fame that few learned men have enjoyed. People came from all parts of Europe to ask his advice. His property amounted at his death to 2,000,000 florins. Peter the Great visited him on his travels, and a Chinese mandarin wrote to him with the address, 'To Boerhaave, the celebrated physician in Europe.' In 1722 an attack of the gout, accompanied with a stroke of apoplexy, obliged him to remit his active pursuits. New returns of his disorder, in 1727 and 1729, compelled him to resign the professorships of chemistry and botany, which he had held for twenty years. In 1730 he was again appointed rector, and at the close of his term delivered a celebrated address, De Honore Medici, Servitute, perhaps the best of all those essays in which he represents the physician as the servant of nature, whose activity he is to awaken and direct. In this he returned in some measure to the principles of Hippocrates, from which, indeed, he had never departed far in practice. Boerhaave was a man of piety as well as learning. He rose early and devoted an hour every morning to prayer and the study of Scripture. He used to say that the life of a patient, if trifled with or neglected, would one day be required at the hands of the physician. He died 23d September, 1738.

BOERS (Dutch, *boer*, a peasant or husbandman), the name commonly applied to the Dutch colonists of the Cape of Good Hope. The Cape Colony was founded by the Dutch in 1650. The Dutch were at this period the leading maritime power of Europe, and their African colonies assumed great importance. When Holland was reduced to the last extremity by the invasion of Louis XIV., serious thoughts were entertained of making the Cape Colony the final refuge of Dutch independence, but this crisis passed away with the advancing power of William. The colony subsequently fell into comparative neglect, and the colonists, left to their own resources, began to develop a character of their own. The troubles in which the parent state was involved by European wars now began also to affect them. The colony was taken possession of by the English in 1795, restored at the Peace of Amiens in 1802, taken again in 1806, and finally ceded to England in 1815. The last change was highly distasteful to the colonists. Naturally distrustful of a foreign government, they had formed from their experience of the country and its inhabitants a policy and habits of their own, into which the new-comers could not be expected at once to enter. The Boers, moreover, were strongly conservative, believing that they understood the situation better than anyone else, and they had acquired in their struggles with the natives a reckless daring, which, added to the coolness and caution of the Dutch character, was likely to make them formidable opponents to any government which provoked their hostility. The policy of the British gover-

nors was not always adapted to the circumstances, and the attempts of the British missionaries, encouraged by the colonial government, to convert and civilize the natives excited the jealousy of the Boers, who thought their own interests compromised by the encouragement given to the converts. The government on various occasions sided with the Caffres against the Boers, which, whatever the merits of the particular disputes, was not calculated to conciliate the latter. The emancipation of their slaves in 1833, and the cession to the Caffres in 1835 of a frontier district of neutral territory in the E., filled up the measure of provocation, and the Boers resolved to place themselves by emigration beyond the British rule. A first band set out by land in 1835 for Port Natal, but being ignorant of the passes of the country, went out of their way. Part of them settled in the district near the Zoutpansberg or Salt-pan Mountain, part proceeded to Algoa Bay, but did not succeed in forming a permanent settlement. Another band also proceeding to Natal was attacked by the Matabalu Caffres, and obliged to fall back on the Modder River. After receiving reinforcements they again advanced, and settling in the Orange River district, formed a commonwealth under Peter Retief. This colony was in 1837 invited to join the British settlers who had in the meantime taken possession of Port Natal. Crossing the Quathlamba Mountains for this purpose, Retief and some of his principal followers were treacherously murdered in an interview with the chief of the Zulu Caffres. The remainder turned southwards, and formed the settlement of Pieter Maritzburg. Under the leadership of Pretorius they defeated the Zulus, but the colonial government denied their right to form an independent community in this district. In 1842 a British force was landed, and the Boers were compelled to retire from the coast and acknowledge the British sovereignty. Many of them recrossed the mountains, and settled in the Vaal district. Further disagreements with the colonial government, which had now possession of Natal, led to another emigration to the N. of the Klipp River. Here they struggled successfully with the Caffres till 1845, when the colonial government proclaimed the Buffalo River the northern boundary of Natal. The Boers openly resisted, but finding their strength unequal to the conflict, again emigrated to the Vaal country. In 1848 the colonial government likewise annexed by proclamation the Orange River settlement. The Boers, headed by Pretorius, took up arms, but being defeated retired beyond the Vaal, and with the previous settlers formed the Transvaal Republic. Those who remained continued their resistance to the British authority until, in 1851, on the outbreak of the Caffre war, the British relinquished the Orange River territory, and recognized the independence of the Orange River Republic. See TRANSVAAL REPUBLIC and ORANGE RIVER REPUBLIC.

The Boers are described as frugal, industrious, and hospitable, but distrustful of foreigners, especially of the English. Their character has sometimes been painted in darker colours, but this applies only to some lawless outcasts, such as the troubles they have passed through might form in any community. Dr. Livingstone has given a vivid account of the degradation of some of those who were settled among the Bechuanas, and of their cruelties to the natives.

BOETHIUS, ANICIUS MANLIUS SEVERINUS, a celebrated Roman statesman and philosopher, was born about 470 A.D., in Rome or Milan, of a rich, ancient, and respectable family; was educated in Rome, in a manner well calculated to develop his extraordinary abilities. Theodoric, king of the Ostrogoths, then master of Italy, loaded him with marks of favour and esteem, and raised him to the first offices in the empire. He exerted the best influence on the administration of this monarch, so that the dominion of the Goths promoted the welfare and happiness of the people who were subject to them. He was long the oracle of his sovereign and the idol of the people. The highest honours were thought inadequate to reward his virtues and services. But Theodoric, as he grew old, became irritable, jealous, and distrustful of those about him. The Goths now indulged in all sorts of oppression and extortion, while Boethius exerted himself in vain to restrain them. He had already made many enemies by his strict integrity and vigilant justice. These at last succeeded in prejudicing the king against him, and rendering him suspicious of Boethius. His opposition to their unjust measures was construed into a rebellious temper, and he was accused of a treasonable correspondence with the court of Constantinople. He was arrested, imprisoned, and executed A.D. 524 or 526. His occupations as a statesman did not prevent Boethius from devoting himself assiduously to the study of philosophy. He was himself a philosopher, and practised in his life the virtues which he taught. He enjoyed a felicity in domestic life, which was due to his own virtues and those of his family. Thus in him the philosopher and the man were not separated. The avocations in which he laboured for the public good were the practical part of his philosophy. He made many laborious translations of the Greek philosophers, particularly of Aristotle. These translations, and especially his commentaries on Aristotle, caused him to be regarded up till the fourteenth century as the highest authority in philosophy. His treatise, De Musica, also supplied for many centuries the place of Greek originals. He was long considered a Catholic saint, but there is no evidence that he was even a Christian. His fame now chiefly rests on his Consolations of Philosophy, written in prison, a work of elevated thought and diction. It is written partly in prose and partly in verse. The oldest edition of this work was published at Nürnberg in 1473. Other editions are, Basel, 1570; Jena, 1843.

BOETHIUS, HECTOR. See BOECE.

BŒTTCHER, JEAN FREDERICK (his name is also spelled BOETTIGER), was born at Schleiz in 1681; died in 1719. A man of dissolute manners and dishonourable conduct, he is celebrated for his extraordinary adventures, and his fortunate discovery of the famous Dresden porcelain. Apprenticed to an apothecary in Berlin, he spent his time in the pursuit of alchemy, and fraudulently pretended to have made gold. This discovery, as it was believed to be, exposed him to the danger of a prosecution for sorcery, to avoid which he fled. Such was the credulity of the time, that the Prussian government was anxious for his return, and the Elector of Saxony, then King of Poland, supplied him with the means of prosecuting his inquiries, and was entertained by his promises for three years. By the advice of Count Tschirnhausen, the elector was induced to turn the real chemical knowledge and abilities of Bœttcher to account in developing the resources of the country. This sensible advice was rewarded with the discovery of a red clay at Meissen, from which a beautiful porcelain could be made. Bœttcher was intrusted with the direction of the manufacture, but was so little trustworthy that he had almost to be detained a prisoner to prevent his divulging the secrets of the process. He had actually entered into a negotiation with some Prussians to do so, and his death alone saved him from the punishment of his treachery.

BOG, marshy land, composed of a substance called peat, the product of the slow decay of a particular

class of plants under certain conditions of temperature and moisture. Bogs were formerly supposed to owe their origin to the destruction of forests, and in particular to the obstruction of drainage from fallen trees, causing lodgments of water, and favouring the growth of marsh plants. This theory can only be partially true. Fallen trees and also standing roots are frequently found in a state of great preservation in bogs, but the agency of felled trees in the production of bog has been completely disproved, 6 or 7 feet of bog being found under the roots of remaining trees, showing the previous formation of the bog. The process of bog formation is thus described:—When a shallow pool induces the formation of aquatic plants, they gradually creep in from the borders to the deeper centre. Mud accumulates round their roots and stalks, and a spongy semi-fluid mass is formed, well suited for the growth of moss, particularly Sphagnum, which now begins to luxuriate, continually absorbing water, and shooting out new plants above as the old decay beneath; these are consequently rotted, and compressed into a solid substance, gradually replacing the water by a mass of vegetable matter. A layer of clay, frequently found over gravel, assists the formation of bog by its power of retaining moisture. When the subsoil is very retentive, and the quantity of water has become excessive, the superincumbent peat has sometimes burst forth and floated over adjacent lands. This happened on Lord O'Neill's estate, in the N. of Ireland, in 1835. Quagmires are caused by the decay of the roots of plants underneath. The plants thus detached from the bottom, rise to the surface, and are kept floating in moisture. Elastic under light pressure, they yield suddenly to the weight of heavy bodies, their only strength consisting in the interlacing of their decayed fibres.

Bogs are generally divided into two classes—red bogs, or peat mosses, and black bogs, or mountain mosses. The former class are found in extensive plains frequently running through several counties. The Chatmoss in Lancashire, and the Allen in Ireland, are examples of this class. Their texture is light and full of filaments, and is formed by the decay of mosses and plants of different kinds. The colour becomes darker, and the density increases with the depth of the bog. The lower parts, being more entirely decayed, approach nearer to the nature of humus than the upper portion. They are also more carbonaceous, and consequently more valuable for fuel. The depth of the red mosses varies from 12 to 42 feet. The chief reasons of the unproductiveness of this class of bogs are the acids in which the plants composing them abound, and which are noxious to the higher orders of vegetation, and the circumstance that the decomposition of the plants takes place under water, where they are excluded from the action of the oxygen and nitrogen of the air, and consequently deprived of the power of evolving carbon and ammonia. Black bog is formed by a more rapid decomposition of plants. It is heavier and more homogeneous in quality. It is common in Ireland and Scotland, but is usually found in limited and detached portions. In Ireland these frequently rest on a calcareous subsoil, which is of great value for reclaiming them. The black bog is so frequently found at high elevations that its reclamation presents considerable difficulties, but when it is found in plains or gentle inclinations it may be reclaimed with comparative ease. The soil in mountainous districts, being shallow, is not suited for cereals, but if the mistake of sowing these is avoided, they may be made into good pasture land. The reclamation of the extensive red bogs found in various parts of the country, especially in Ireland, which has more than a million and a half of acres of them, has long occupied attention; but the progress of improvement has been hindered by questions of land tenure, disposal of capital, and other difficulties external to the practicability of the desired reformation. Many extensive experiments have, however, been made with encouraging success, and while it is perhaps doubtful how far reclamation will repay the immediate improver, it appears from a national point of view to offer undoubted advantages.

In the reclamation of bog land three things require to be accomplished. The land must be thoroughly drained, and a permanent system of drainage established. The loose and spongy soil must be mixed with a sufficient quantity of mineral matter to give the requisite firmness to its texture, and to fertilize its superabundant humus. Proper manures must be provided to facilitate the extraction of nutriment from the new soil, and a rotation of crops suitable for bringing it into permanent condition adopted. The difficulties of reclamation lie chiefly in the first and second of these requirements.

When the bog land is flat there is often considerable difficulty in providing main drainage with sufficient inclination to carry off the redundant moisture. There is a still greater difficulty in working deep bogs, and in the formation of the minor drains, from the treacherous nature of the soil. Men, horses, and even ploughs have to be provided with pattens or flat boards to prevent them from sinking; the drains also, from the yielding nature of the soil, are apt to fill up. The bog is sometimes cut up at first into open sections, which are gradually filled over as permanent drains are established, or the minor drains are cut at regular intervals in the form of wedges, narrowing as they descend, and with a shoulder on which the surface turf is replaced. These coverings, however, frequently give way. Wedges of earth or compressed turf are sometimes inserted to keep the drains open. When the soil is stony a permanent drainage is sometimes provided by raising the stones and breaking them to form a bed of gravel to lay in the furrows.

The materials best adapted for reclaiming peat are calcareous earths, limestone gravel, shell marl, and shell sand. Caustic lime, although it neutralizes the acids of the soil, causes too rapid a decomposition of the vegetable matter. These materials are frequently found in the subsoil or in the neighbourhood, but the labour of raising them from the subsoil is often greater than that of bringing them from other, especially from adjacent quarters.

Paring and burning, or removing a portion of the peat for fuel, when the subsoil is good, are other modes of facilitating improvement. The limited demand for peat fuel prevents the latter system being carried on extensively. Thoroughly reclaimed bogs are not liable to revert to their former condition. For further particulars of reclamation see CHATMOSS.

BOGATZKY, KARL HEINRICH VON, a well-known Protestant theological writer, born at Tankowa, Silesia, 1690; died at Halle, 1774. His principal works are, Tägliches Schatz-Kästlein der Kinder Gottes, published in 1718, Geistlieche Gedichte, in 1749. The former has been translated into English, and is well known by the title of Bogatzky's Golden Treasury.

BOGDANOWITCH, HIPPOLYT FEDEROWITCH, the Russian Anacreon, was born in 1743 at Perewolotschna, in White Russia. His father was a physician. He was designed for an engineer, went for the purpose of studying engineering to Moscow in 1754, and entered an academy there; but the sight of a splendid play, and the reading of Lomonossow's poems, turned his inclination to poetry. He wished

to become an actor, but the manager of the theatre, Cheraskow, dissuaded him from his purpose. By his advice he applied himself to the study of the fine arts, and to learning foreign languages. He gained patrons and friends, and in 1761 was made inspector in the University of Moscow, and afterwards translator in the department of foreign affairs. In 1762 he travelled with Count Beloselsky as secretary of legation to Dresden, where he devoted his whole attention to the study of the fine arts and of poetry till 1768. The beautiful pictures in the gallery of that place inspired him to write his Psyche (*Duschenka*), which appeared in 1775, and fixed his fame on a lasting foundation. After this he devoted himself to music and poetry, in solitary study at St. Petersburg, till Catharine called him from his retirement. He then wrote on different occasions several dramatic and historical pieces. In 1788 he was made president of the imperial archives. In 1795 he took leave of the court, and lived as a private man in Little Russia. Alexander recalled him to St. Petersburg, where he lived till 1803. He was as remarkable for modesty as for genius, and a man of childlike goodness and vivacity.

BOGDO-OOLA, or HOLY MOUNT, a remarkable hill, Russia, in the government of Astrakhan, near the Aktuba, and 14 miles E. of Tchernoiarsk. It forms an isolated cone, nearly 500 feet high, in the middle of a vast steppe. It appears to rest on limestone, overlain by sandstone, which on the N.E. side rises perpendicularly like a wall, and is cut into deep clefts, frequented by innumerable birds. The sandstone is succeeded by alternate red and white layers of clay and sand, which have a very singular appearance. The summit is chiefly composed of masses of rock-salt, which the Kalmucks account for by saying that the Dalai-Lama once passed a night on the hill, and when dining let fall a grain of salt, which grew up into the salt cone. At the foot of the hill there is a salt lake called Bogdoin Dabassu.

BOGLIPOOR. See BHAGULPORE.

BOGODOUKHOFF, or BOHODOUKHOFF, a town of Russia, capital of a district of the same name, in the government and 34 miles N.W. of the town of Kharkov, on the Merle. It has a trade in ox-hides and goat-skins, which are prepared in considerable quantity. Pop. 9999.

BOGOMILI, or BOGOMILES, a sect founded in the twelfth century by Basil, a physician of Bulgaria, who was burned alive at Constantinople in 1118. The name of the sect is composed of two Slavonic words (*bog*, Lord, and *milui*, have mercy), and refers to the frequent prayers by which they were distinguished. The Bogomili believed that God had two sons, Sathaniel and Logos. The former rebelled, and created the material world. God gave life to man, but he was left under the control of Sathaniel until the coming of the Logos. The law was consequently given to Moses by Sathaniel, and is not recognized by the Bogomili, who accept of the Old Testament only the Psalms and the Prophets. The Logos, or Christ, came down from heaven to destroy the works of Sathaniel. He banished him to hell, after cutting off four letters of his name, and he is since known only as Satan. This sect, which held many other extravagancies, continued to exist for about a century. They practised severe asceticism, rejected the sacraments, or put new interpretations on them, and made frequent prayers both by day and night.

BOGORODITZK, a town of Russia, capital of a district of the same name, in the government and 32 miles S.E. of the town of Tula. It is a mean-looking place, but contains three churches and a fine palace. It exports grain, flax, and honey produced in the district. Pop. 7290.

BOGOS, a people of Abyssinia, occupying a district to the S. of the Anseba, to the E. of Habab and Mensa, and to the N. and W. of Barca. The land is intersected by the broad and beautiful valley of the Anseba, and comprises on the W. the elevated and hilly region as far as the sources of the Barca, and on the E. the slopes of the plateau of Mensa. The climate and vegetation are similar to those of Abyssinia. The rainy season lasts from March to September, when the Anseba overflows its banks and fertilizes the valley through which it flows. There is a great variety both in the flora and the fauna of the country. Large baobab-trees, sycamores, and tamarinds overshadow the banks of the Anseba, which are rendered almost impassable by the number of Euphorbiæ and creeping-plants. At the same time there are to be found rhinoceroses, elephants, wild boars, buffalos, antelopes, lions, leopards, wild cats, jackals, wolves, &c., in great numbers. The pop., according to Münzinger, is only about 10,000, who are engaged in agriculture and the rearing of cattle, and carry on a trade with the neighbouring places in corn, butter, ivory, skins, buffalo-horns, and ostrich-feathers. Their language, which is akin to the Agow, is called by themselves Belén. Their countenance is Greek in its contour, their body light, powerful, and well formed; the colour of their skin dark olive brown; their lips are thin, the cheek-bones not prominent, and they have generally bushy whiskers. The patriarchal institutions of the Bogos are peculiar. The members of each union of families are pledged to apprehend any one of their number who is charged with the commission of a crime. The laws relating to dowries, inheritance, and murder are regularly codified. The religion is the Christian, but Mohammedanism, which is increasing, has a considerable number of adherents.

BOGOTÁ (formerly *Santa Fé de Bogotá*), a city of South America, capital of the republic of New Granada, the seat of government, and of an archbishopric; lat. 4° 35′ 48″ N.; lon. 74° 13′ 45″ W. It is situated on an elevated plain, 8863 feet above the sea, at the foot of two lofty mountains, with a delightful though moist climate, resembling a perpetual autumn; the temperature rarely exceeding 59° Fah. Seen from a distance, it presents a very imposing appearance, rising in the form of an amphitheatre. The streets are narrow, but regular, crossing each other at right angles, and many of them having a stream of water flowing down the middle. They are all paved, and have footpaths, but are indifferently lighted; and, there being no common-sewers, are often in a filthy state. The principal street, *Calle Real*, is very handsome, terminating at one end in a square, formed by the palace of the president, the cathedral, the custom-house, &c. There are several other squares besides, of inferior pretensions, though spacious, and all ornamented with fountains. Bogotá being subject to earthquakes, the houses are low, and strongly built; few of them exceeding two stories in height. They are constructed of sun-dried brick, white-washed, and tiled, without chimneys, stoves only being used. Traffic is carried on in the streets by mules, no vehicles of any kind being employed. The religious structures of the city are disproportionately numerous, there being no fewer than twenty-six churches, a cathedral, nine monasteries, and three nunneries. The churches, though gorgeously adorned interiorly, display more splendour than taste. Bogotá contains a university, three colleges, most of the professors in which are monks or priests; a school of chemistry and mineralogy, a Lancasterian school, a national academy, a public library, an observatory, a botanic garden, and a well-attended theatre. A bank was established in 1870 with a capital of 250,000 dollars.

The inhabitants, mostly Creoles, are described as a mild, polite, and cheerful people. The women are reputed handsome, with fair and clear complexions, and Spanish physiognomy. The market is well supplied with provisions of every kind, and with fruits and vegetables, the former including strawberries, pine-apples, peaches, &c. The trade of Bogotá is very considerable, and will probably be much increased on the completion of the road now in progress to the port of Buenaventura, on the Pacific. The manufactures consist of soap, cloth, leather, and precious metal, but cannot be said to be of any great importance. Bogotá was founded in 1538 by Quesada, and made an archbishopric in 1561. It rapidly increased in size, importance, and population, and became the capital of the Spanish vice-royalty of New Granada. In 1811 it was the seat of the congress which, following the example of Venezuela, proclaimed the republic on the 12th of November. Bogotá was taken by the Spanish party under Morillo in 1816, but relieved by Bolivar in August, 1819, and soon after became the capital of the United Republic of Colombia, till the partition of the latter into three states in 1831. Since 1863 it has been the capital of the United States of Colombia or New Granada. Pop. 40,000.

BOGUE, DAVID, the originator of the London Missionary Society, was born at Hallydown, Berwickshire, on the 18th February, 1750; died 25th October, 1825. After the usual course of study at Edinburgh, he was licensed as a preacher in connection with the Church of Scotland. In 1771 he removed to London, and was for sometime employed as usher in an academy, and afterwards became minister of an Independent chapel at Gosport. In 1780 he became tutor to an establishment for directing the studies of young men destined for the ministry in the Independent communion. Though employed with the details of what most men would have felt as a full occupation of their time, he now began the formation of a grand missionary scheme, which afterwards resulted in the London Missionary Society. The influence which the establishment of this institution had on the public mind was great, and the springing up of the British and Foreign Bible Society and the Religious Tract Society, at short intervals, proves how much good was effected by the impetus it imparted. In the establishment of both of these he took an active part, contributing to the latter body the first of a series of publications which have been of great use. In the year 1796 Mr. Bogue was called upon to show whether he was sufficiently imbued with the spirit of the gospel to enable him to forsake home and the comforts of civilized society, to devote himself to its sacred cause. The call was made by Robert Haldane, of Airdrie, who sold his estate to furnish funds for the enterprise. Their design was, in conjunction with two divines, who had recently left the Established Church of Scotland, and become Independent ministers, to preach the gospel to the natives of India, and to form a seminary for the instruction of fellow-labourers in the same field. The names of the two other ministers who intended to join in this enterprise were the Rev. Greville Ewing of Glasgow and the Rev. W. Innes of Edinburgh. But the design was frustrated by the jealousy of the East India Company, who refused their sanction to the undertaking, a fortunate circumstance, in as far as the missionaries were concerned; for a massacre of Europeans took place at the spot where it was intended the mission should have been established, from which these Christian labourers could scarcely have hoped to escape. In 1815 Mr. Bogue received the diploma of Doctor of Divinity from the senatus academicus of Yale College, North America. His zeal for the cause of missions, to which he had consecrated his life, continued to the last: he may truly be said to have died in the cause. He annually made tours in different parts of the country in behalf of the missionary society; and it was on a journey of this kind, in which he had been requested to assist at a meeting of the Sussex Auxiliary Society, that he took ill at the house of the Rev. Mr. Goulty of Brighton, and died after a short illness. The only works of any extent for which we are indebted to the pen of Dr. Bogue are, An Essay on the Divine Authority of the New Testament; Discourses on the Millennium; and a History of Dissenters, which he undertook in conjunction with his pupil and friend Dr. Bennet. The first of these has been translated into the French, Italian, German, and Spanish languages, and has been widely circulated on the continent of Europe.

BOGUSLAWSKI, PALM HENRY LOUIS OF, an eminent astronomer, born in 1789 at Magdeburg; died 1850. He was educated in the cathedral school of Magdeburg, and early displayed a particular turn for astronomical pursuits. In 1806 he served for a short time in the army. The comet of 1807 gave him the first opportunity of making special observations. In 1809, having been appointed bombardier in the Silesian Artillery Brigade, he passed his examination in Berlin with so much distinction that he was named lieutenant, and remained in attendance on the general military school in Berlin, where he took part in Bode's observations on the great comet. The campaigns of the war of independence procured him, through his connection with Bode, access to the best observatories and the acquaintance of the most distinguished astronomers. At the battle of Pirna he was wounded, and carried prisoner to Pirna. Having soon obtained his liberty, he joined his corps at Erfurt. His military career terminated at the battle of Waterloo, where, in consequence of a supervening weakness in his eyesight, he became unfit for further active service. He afterwards turned his attention to agriculture, and in course of time his eyesight was completely restored. His love for astronomy had always remained, though he had wanted proper opportunity for cultivating it; but in 1829, on resuming his residence in Breslau, his studies again took that direction, and he became first conservator and then director of the observatory. By his discovery, in 1834, of the comet named after him, and his observations on Saturn's rings, and the comets of Biela, Encke, Halley, &c., he rendered important services. As no chair was connected with his position at the observatory, he at first merely delivered popular lectures. A regular professorship, however, was given him in 1836. As a writer he made himself known by the publication of the Uranus (vols. i.–iii., Glogau, 1846–48).

BOHEMIA, BÖHMEN (anciently *Böheim*), received its name from a tribe of Gallic origin, the Boii, who were expelled by the Marcomans at the commencement of the Christian era; the latter were in turn obliged to give place to the Germans, and these to the Czechs, a people of Slavonic origin, who had established themselves in Bohemia by the middle of the fifth century, and who still retain possession of it. The country was at first divided into numerous principalities, which were temporarily united into a monarchy in 627 under Samo, but the work of this prince did not survive himself. Charlemagne attempted the conquest of Bohemia without permanent result, although he succeeded in rendering it tributary; and the Emperor Louis had his army nearly destroyed by the Bohemians in 849. Christianity was introduced into Bohemia in the reign of Borzwog I. (894–902), a descendant of Przemysl, a race which held sway in Bohemia for about six centuries (722–

1306). In 1092 Bohemia was finally recognized as a kingdom under Wratislas II. Up to 1230 the monarchy was elective and then became hereditary; the right of election, however, was suspended, not abrogated. The monarchs received investiture from the German emperor, held one of the great offices in the imperial court, and were recognized as among the seven electors of the empire. Separated from Germany, however, by a rampart of mountains, by origin, language, and national customs, the Bohemians kept aloof from the general politics of the empire, and their kings frequently received dispensations from attending the diet. The government bore more resemblance to that of Poland than to the feudal system. The peasantry were in a state of villenage, but there was a numerous and powerful nobility, the diet assembled frequently and the nobles came armed to defend their rights. The royal authority was also limited by the coronation oath.

Bohemia was frequently at war with Poland, the emperor, or some of the surrounding states; it was successively united and disunited with Hungary, Silesia, Moravia, &c., according to the course of wars and alliances. Ottokar II. (1253–1278) had extended his conquests almost from the Adriatic to the Baltic, when he lost them and his life in contest with Rudolph, the founder of the too successful house of Hapsburg. His grandson Wenceslas III. was assassinated at Olmütz, and with him closed the dynasty of Przemysl. The house of Luxemburg succeeded in 1310, and governed Bohemia till 1437. Under Charles IV. (1346–1378), who also held the sceptre of the German Empire, Bohemia prospered, and advanced in civilization and science. Towards the close of this second dynasty civil wars were excited by the promulgation of the doctrines of Huss and the persecution of his followers. These wars were protracted by the genius of John Ziska, the leader of the Hussites, a man who, although deprived of sight, has for military genius been compared to Hannibal. Ziska never was defeated, and his success inspired the utmost enthusiasm in his followers. He has been called the inventor of the modern art of fortification, and by his skill in this art he made Mount Tabor an impregnable fortress. After the death of Ziska the moderate party of the Hussites, who were called Callixtines, from their insisting on the retention of the sacramental cup, of which the Catholic priests deprive the laity, united with the Catholics, and Sigismund was acknowledged king in 1433. The condition of this compact being ill observed, George Podiebrad, a nobleman of the reformed party, was by them elected king in 1458. On his death in 1471 they chose Wladislas, son of Cassimir, king of Poland, who also obtained the crown of Hungary. His son Louis lost both crowns with his life in the battle of Mohacz against the Turks, and Ferdinand of Austria became in 1527 sovereign of both kingdoms. Bohemia then lost its nationality, being declared hereditary in the house of Austria. Its subsequent history pertains to that of the Austrian Empire. It was desolated by the Thirty Years' war, and has often suffered from religious persecutions, by which, indeed, the reformed faith was almost entirely suppressed in it. The Emperor Joseph II. gave some protection to the Protestants.

In 1848, when Europe was convulsed with revolutionary movements, a momentary attempt was made to assert the ancient independence of Bohemia against the Austrian dominion; a conflict took place between the army and the people, Prague was bombarded, and the insurrection suppressed.

The Kingdom of Bohemia is bounded on the S.W. by Bavaria, on the N.W. by the Kingdom of Saxony, on the N.E. by the Prussian province of Silesia, and on the S.E. by Moravia and the archduchy of Austria. It contains 20,223 square miles, and has 5,140,144 inhabitants, of whom above three-fifths are Czechs, nearly 90,000 Jews, and more than 2,000,000 are Germans. The prevailing religion is the Roman Catholic; other sects, however, are tolerated. The language of the country is Bohemian, a dialect of the Slavonic: in some districts, and in most of the cities, German is spoken. Bohemia is surrounded on all sides by mountains, is covered with large forests and considerable ponds. The number of the latter is reckoned at 20,000. Its plains are remarkably fertile. The largest rivers are the Elbe and the Moldau. All sorts of grain, flax, hops (the best in Europe), and fruits are exported. Wine is not abundant, but in the neighbourhood of Melnik is of pretty good quality. The raising of sheep, horses, swine, and poultry is carried on to a considerable extent. The mines yield silver, copper, lead, tin, garnets and other precious stones, iron, cobalt, arsenic, uranium, and tungsten, antimony, vitriol, alum, calamine, sulphur, plumbago, and coal in abundance. There are also numerous mineral springs, but little salt.

The industry of Bohemia, favoured by its central situation, has long rendered it one of the most important governments of the Austrian Empire. Spinning and weaving are extensively carried on in the northern and south-eastern districts; manufactures of lace, ribbons, metal and wood work, chemical products, and other branches of skilled industry, are also largely developed. Pottery, porcelain, glassware, cutting of precious stones give employment to many hands. The glass-ware of Bohemia alone, which is known all over Europe, employs 50,000 workers. The annual exports are nearly £2,000,000; imports over £1,500,000. Bohemia contains, including the city of Prague, thirteen circles, governed by officers appointed yearly. The largest towns are Prague, Pilsen, Reichenberg, Budweis, Smichow, and Warnsdorf. For internal intercourse there are excellent highways, extending 10,000 miles, and several important lines of railway leading both S.E. to Vienna and N.W. towards Dresden.

The Bohemians of all ranks are distinguished for public spirit. Among their public establishments for education are a university, three theological academies, twenty-three gymnasiums, and 3851 schools. The number of students attending the University of Prague in 1869–70 was 1710.

BOHEMIAN BRETHREN, the name of a Christian sect which arose in Bohemia about the middle of the fifteenth century from the remains of the stricter sort of Hussites. Dissatisfied with the advances towards Popery, by which the Calixtines had made themselves the ruling party in Bohemia, they refused to receive the *compacts*, as they were called, that is, the articles of agreement between that party and the council at Basel (30th November, 1433), and began about 1457, under the direction of a clergyman, Michael Bradatz, to form themselves into separate parishes, to hold meetings of their own, and to distinguish themselves from the rest of the Hussites by the name of *Brothers*, or *Brothers' Union;* but they were often confounded by their opponents with the Waldenses and Picards, and on account of their seclusion were called *Cavern-haunters* (*Grubenheimer*). Amidst the hardships and oppressions which they suffered from the Calixtines and Catholics without making any resistance, their numbers increased so much, through their constancy in their belief and the purity of their morals, that in 1500 their parishes amounted to 200, most of which had chapels belonging to them. The peculiarities of their religious belief are seen in their confessions of faith, especially their opinions with regard

to the Lord's supper. They rejected the idea of transubstantiation, and admitted only a mystical spiritual presence of Christ in the eucharist. In other points they took the Scriptures as the ground of their doctrines throughout, and for this, but more especially for the constitution and discipline of their churches, received the approbation of the reformers of the sixteenth century. This constitution of theirs was framed according to the accounts which remain of the oldest apostolic churches. They aimed at restoring the primitive purity of Christianity by the exclusion of the vicious from their communion, and by making three degrees of excommunication, as well as by the careful separation of the sexes, and the distribution of the members of their society into three classes—the beginners, the proficients, and the perfect. Their strict system of superintendence, extending even to the minute details of domestic life, did much towards promoting this object. To carry on their system, they had a multitude of officers of different degrees; viz. ordaining bishops, seniors, and conseniors, presbyters or preachers, deacons, ædiles, and acolytes, among whom the management of the ecclesiastical, moral, and civil affairs of the community was distributed. Their first bishop received his ordination from a Waldensian bishop, though their churches held no communion with the Waldenses in Bohemia. They were destined, however, to experience a like fate with that oppressed sect. When, in conformity with their principle of not performing military service, they refused to take up arms in the Smalkaldic war against the Protestants, Ferdinand took their churches from them, and in 1548, 1000 of their society retired into Poland and Prussia, where they first settled in Marienwerder. The agreement which they concluded at Sendomir, 14th April, 1570, with the Polish Lutherans and Calvinistic churches, and still more the Dissenters' Peace Act of the Polish Convention, 1572, obtained toleration for them in Poland, where they united more closely with the Calvinists under the persecutions of the Swedish Sigismund, and have continued in this connection to the present day.

Their brethren who remained in Moravia and Bohemia recovered a certain degree of liberty under Maximilian II., and had their chief residence at Fulneck in Moravia, and hence have been called *Moravian Brethren*. The issue of the Thirty Years' war, which terminated so unfortunately for the Protestants, occasioned the entire destruction of their churches, and their last bishop, Comenius, who had rendered important services in the education of youth, was compelled to flee. From this time they made frequent emigrations, the most important of which took place in 1722, and occasioned the establishment of the new churches of the Brethren by Count Zinzendorf. Although the old Bohemian Brethren must be regarded as now extinct, this society will ever deserve remembrance, as a quiet guardian of Christian truth and piety, in times just emerging from the barbarity of the middle ages; as a promoter of pure morals, such as the reformers of the sixteenth century were unable to establish in their churches; and as the parent of the esteemed and widely extended association of the United Brethren, whose constitution has been modelled after theirs.

BOHEMIAN AND BAVARIAN FOREST. From the Fichtelgebirge southward towards the confluence of the Ilz and the Danube, extends a ridge of mountains called the Böhmerwald or the *Bohemian Forest*, in ancient times a part of the *Silva Hercynia*, the highest peaks of which are the Arber (4320 feet high), Rachel, and others. It separates Bavaria from Bohemia. The great abundance of wood has occasioned the establishment of many glass-houses, forges, &c., in this region. The inhabitants have acquired, in their seclusion from the world, many characteristic virtues and vices.

BOHEMIAN LANGUAGE. The Czechish (Bohemian) dialect was the first of the Slavonic idioms which was cultivated scientifically. This dialect is spoken in Bohemia, Moravia, with slight variations in Austrian Silesia, in half of Hungary, and in Slavonia. That the Czechish has been widely spread as a dialect of the Slavonian is proved, as well by its antiquity and its degree of cultivation, as by the extent of the countries whose national language it is.

The Bohemian has a wonderful facility for forming new derivatives from native roots. Thus, from the single radical word *byti* (his) there are more than 110 derivatives; from the radical word *dĕje se* (ĕ read like *ea*), signifying *it happens*, there are more than ninety-five, without reckoning the frequentative verbs, verbal substantives, and adjectives. By the simple prefixing of the letters *s*, *w*, *v*, *z*, the verb acquires a different signification; that is, *s-razyti*, *v-razyti*, *w-razyti*, convey the meanings *to beat down*, *to beat off*, *to beat in*. Hence this language has formed, from native roots, all the scientific terms of theology, jurisprudence, and philosophy, and with every new invention can be further developed.

If one compares the Bohemian radical words with the analogous terms in other languages, he will be astonished at the number of inflections and derivations by which the language of the Czechi is distinguished. A great part of the facility with which it receives new forms and additions rests upon its manifold declensions, and its numerous tenses and participles. In this respect the Bohemian and other Slavonic languages excel those of all other modern nations, and equal the Latin or Greek. The participles give them a great deal of pliability, as they unite in themselves the advantage of verbs and adjectives by denoting, as verbal adjectives, at once the quality of the thing and the determination of the time, saving thus the use of the relatives *which*, *who*, *as*, and the prepositions *after*, *since*, &c., by which periods become so dragging: hence its conciseness.

Another peculiarity is the great variety of diminutives, by which not only small, but agreeable and dear objects are designated; also the ways of expressing concisely the frequent naming of a thing; for instance, *Frantiskowati se* (*s* read as *sh*), to use frequently the name Francis; *macechowati se*, to use frequently the name step-mother. It possesses also the patronymic nouns; for instance, *kralowec*, the king's son. It indicates concisely that an action is completed; as *dopsati*, to write to an end. It contains the inceptive verbs; for example, *krbatjm*, I am becoming hunchbacked; and many others.

The Bohemian language, moreover, has much expressiveness and energy, as it is not weakened by a number of articles, auxiliary words, conjunctions, and words of transition, but is able to represent the objects of imagination, of passion, and all the higher emotions of the poet and orator, in a quick, vigorous, and lively manner; by its brevity, heaping together the most significant words, and arranging the connection of the parts of speech according to the degree of feeling to be expressed, so as to give the style spirit and energy, or gentleness and equability. The Bohemian designates many objects by the imitation of natural sounds. Thus the names of many animals are taken from their voices, as *kruta*, the turkey; *kachna*, the duck. Many plants are named from their effects, as *bolehlaw*, hemlock (from headache). The conciseness of the language is increased by the absence of auxiliaries in the greater part of the verbs. The preterites, in the third person singular and plural,

express a meaning still further condensed, as the variation in the last syllable is made to designate the sex; for example, *psal, psala, psalo*, he, she, it has written; *psali, psaly, psala*, they have written. In like manner the Bohemian saves many prepositions and much circumlocution of other kinds, by the use of the *instrumental* agreeing with the Latin ablative; for instance, *secenjm mece hlawu mu st' al* (*t* read like *te*), with a blow of the sword he has cut off his head. This language is, therefore, very well fitted for the translation of the Latin classics. By the use of the past participle active the Bohemian can designate, as well as the Greek, who has really performed the action contained in the predicate of the accessory clause, which the Latin, with its ablative absolute, or participle passive, must leave always undefined and dubious. Every notion, moreover, is expressed by a peculiar word; for example, the verbs *zjti, strjhati, krdgeti, rezati*, denote to cut with the scissors, with the sickle, with the knife, and with the scythe. In the subtlety of grammatical structure the Bohemian is like the Greek, and has the advantage over the Latin and other languages. In speaking of two hands, two eyes, &c., the dual number is used; for example, *ruce, oci*, &c. The language is also capable of expressing the idea of duration, referring to an indefinite past time, like the Greek aorist; for instance, *kupowal dum, ale nekaupil ho*, he was engaged in buying the house, and did not buy it. The language affords several preterite tenses, which are distinguished with great subtlety, as *kaupil*, he has bought once; *kupowal*, he had purchased for a long time; *kupowdwal*, he had purchased formerly several times; *kupowdwdwal*, he seldom had purchased in former times; where, by adding the auxiliary verb *byl*, a time still longer passed may be expressed, though this is very seldom used; for instance, *byl kupowdwal*, he had purchased in times long past. Another advantage of the language consists in the many future tenses by which the Bohemian denotes not only the time but also the duration, and the more or less frequent repetition of the action; for instance, *kaupjm*, I shall purchase once; *budu kupowati*, I shall be purchasing for a long time; *budu kupowdwati*, I shall purchase several times; and *budu kupowdwati*, I shall be purchasing very often. Not less manifold in signification, and equally subtle in the determination of time, are the participles and the participial constructions. The determination of the sex and the number by the final syllable of the participle gives the Czechish language no small advantage over others. The small connective particles of speech the Bohemian has in common with the Greek. The Greek *alla, men, gar, de, te*, &c., agree with the Bohemian *ele pak, wsak, li, z, t'*; only the three latter are always affixed to a word. Finally, the free, unrestrained arrangement of the words contributes much to perspicuity, as the Bohemian is less fettered than any of the other modern languages to a particular construction.

By a happy mixture of vowels and consonants, and by a combination of the latter favourable for the pronunciation, the language has also much euphony, though many call it rough on account of the *r* (read *rsh*); but the sound of entire words, not that of the single letters which compose them, determines the roughness or smoothness of their pronunciation. The terminations of the various declensions and conjugations are mostly vowels, or the smoother consonants. In general, the Bohemian has a natural melody like that of the Greek, for the tongue stops longer on a syllable containing a long vowel, *á, é, j, u, y*, than on one containing a short vowel. The Bohemian alphabet consists of forty-two letters, expressing a great variety of sounds. The English sound of *ts* (the Bohemian expresses with *c*, the English *y* with *g*, the *sh* with *ss* or *s*, the Italian *ce* or *ci* with *c* modified, the French *ge* and *gi* with the *z*, the Italian *u* with the *y*, the *gn* with the *n*, the English *w* with the *w*, particularly at the end of words. It is very seldom that combinations of difficult consonants are to be found in the Slavonic idioms, and these may be softened by the freedom of construction which the language allows. In musical value Bohemian comes next to Italian. Language has much influence on the development of national music, and the native opera flourishes in Bohemia, while Bohemian singers are known throughout Europe.

BOHEMIAN LITERATURE has five periods. The first extends from the mythological times to 1409. It is certain that, among the Slavonian tribes, the Czechi were the first who cultivated and fixed their language. (See SLAVONIANS, SLAVONIC LANGUAGE.) It affords no written documents of remote antiquity, unless we believe the Runic characters to have been in use before the introduction of Christianity. We know, however, that the language of that period was similar to the present from the names of the gods, dukes, rivers, cities, mountains which have been preserved, such as Perun, Przemysl, Borzwog, Wltawa, Bila, Praha, Tetin, Krkonose. The Slavonian apostle Method, and the philosopher Constantine, called *Cyril*, made the Slavonians in Moravia acquainted with Christianity. From thence it penetrated under Duke Borzwog to Bohemia, and thus the people of this country received the Græco-Slavonic ritual in the year 845. The same Constantine invented for the sounds of the Slavonic language the Cyrillo-Slavonic alphabet, borrowed mostly from the Greek. In later times the Glagolitic alphabet sprang up, of which, however, less use was made. When the Latin church supplanted the Greek in Moravia, Bohemia, and Pannonia, the Latin alphabet came also into use instead of the Cyrillic. In Bohemia the Cyrillic character was in use only with the monks of Sazawa, who observed the Slavonic ritual. As the Latins endeavoured to annihilate all the writings of the old ritual, and the Slavonic language was, in many cases, obliged to give way to the Latin, Bohemian literature suffered incalculable injury; hence we possess from the earlier centuries but a few insignificant remains in the characters above-mentioned. In the tenth century the Bohemians had a school at Kudet, in which they learned Latin. Their most ancient relic is the hymn (Hospodine Pomiluyny) of Bishop Adalbert (Wegtech), a native Bohemian, which is sung to the present day even by the Russians and Poles. Some think it of still greater antiquity. Zawis Z. Rozmberka wrote, in 1290, several good poems. The Bohemians possess some remains of a collection of lyrico-epic national songs, without rhyme, which seem to have been of great merit. The manuscript appears to have been written in 1290 and 1310. Goethe found these national songs worthy of particular attention. Under the Emperor Charles IV., who promoted the cultivation of the Bohemian language, the University of Prague was founded in 1348. In the Golden Bull he commanded the sons of the German electors to learn the Bohemian language. Under his son, the Emperor Wenceslas, all decrees were written in Bohemian, which formerly were in Latin. Prague was then not only the most populous city in Germany, but also, on account of its splendid court and the wealth of its citizens, the centre of the arts and sciences. Dalimil Mezericky wrote a history of Bohemia in verse; Ondreg Z. Dube, a collection of Bohemian laws, in three vols.; Warinec Z. Brezowa, a history of the Roman emperors, and translated Mandeville's Travels; and Pribik Pulkawa, a Bohemian history.

This period affords also many vocabularies, poems, songs, and translations.

With Huss commenced the second period, from 1409 to 1500, which elevated the character of the Bohemian language and nation. The prevalence of religious disputes caused the Bible to be generally read and understood. Huss of Hussinetz translated Wickliffe's book Trialogus into the Bohemian tongue, and sent it to the laymen as presents. The Treatise of the Six Errors he caused to be inscribed in Bohemian on the walls of the chapel of Bethlehem. He wrote his first collection of sermons when at the castle of Kozy (1413), besides an Appeal to the Pope, a Commentary on the Ten Commandments, an Explanation of the Twelve Articles, two sermons on the Antichrist, the Triple Cord, and several excellent hymns. His letters from the dungeon in Constance to the Bohemians were translated by Luther into Latin, accompanied with a preface, and printed at Wittenberg in 1536. He and Jakobellus and Jerome improved and distributed the Bohemian Bible, of which several copies have been preserved to our times. Of Ziska of Trocnow, one of the greatest generals in history, several letters and his rules of war have been preserved. From this period there have come down to us, also, several war-songs of the Taborites, also some songs of Prague. Martin Lupac undertook, with the assistance of some learned men, the labour of retranslating the whole New Testament. The church-service was now performed entirely in the Bohemian language. Many controversial writers of this period might be mentioned. Mladienowic, an eye-witness of the execution of Huss, wrote an account of his life. This used to be read in the Bohemian churches. Procopius continued the rhyming chronicles of Dalimil. Lodkowic related his Journey to the Holy Sepulchre. Sasek of Mezyhor wrote Notes and Travels through Germany, England, France, Spain, Portugal, and Italy of the Bohemian Baron Loew of Rozmital and Vlatna (whom he accompanied), a contribution to our knowledge of the manners of the fifteenth century, which was published by Jos. Edm. Horky, in a German translation printed at Brunn, 1824. M. Gallus, Albjk, Chrislan, Zidek, J. Cerny, J. Blowic, and Sindel, wrote on medicine, astrology, and agriculture. As early as 1447 we have an anonymous work on the grafting of trees. We have also the rhyming legend of the 10,000 knights, a translation of the fables of Æsop, the council of the beasts and birds, in prose and verse, in three vols. (Placj Rada). Each lesson, which flows in rhyme from the mouths of the animals, is preceded by the natural history of the animals and the moral. It was printed three times in the Bohemian language, and published at Cracow in Latin verse, 1521, 4to. Of the Bible fourteen translations have come down to us, besides ten of the New Testament. The oldest, of the year 1400, is in Dresden. The typographic art made a rapid progress in Bohemia. The first printed work was the Epistle of Huss from Constance, in 1459; the second, The Trojan War, in 1468; the third, a New Testament, in 1474; the whole Bible, in 1488; the first almanac, in 1489.

The third age, from 1500 to 1620, may be called the golden age of the Bohemian language. During those dreadful tumults in which, not only in this kingdom, but also in the neighbouring countries, populous cities became heaps of ashes, and innumerable villages entirely disappeared, the peculiar tendency of the people to investigation, and their predilection for science and art, developed themselves. The cultivation of learning—in other countries, with only a few exceptions, the monopoly of the clergy—was in this favoured land open to the whole nation. All branches of science were elaborated, and brought to an uncommonly high degree of improvement for that time. The purpose of this work does not allow us to enumerate all the authors of this age, since under Rodolph II. alone there were more than 150. Gregory Hruby of Geleni translated the work of Petrarch De Remediis utriusque Fortunæ. W. Pisecky translated from the Greek the Exhortation of Isocrates to Demonikos. John Amos Comenius wrote fifty-four works, some of which were very excellent. He published his Janua and an Orbis Pictus, which were translated in his lifetime into eleven languages, have passed through innumerable editions, and are not yet surpassed. In all the N. of Europe Comenius attracted attention by his projects for improving education, which were deliberated upon even by the diet of Sweden and the Parliament of England. The hymns of this and the earlier ages, part of which have been translated by Luther, may serve as standards for all languages. In Prague alone there were at this period eighteen printing-presses, in the country towns of Bohemia seven, and in Moravia also seven: many Bohemian books, too, were printed in foreign countries, as in Venice, Nürnberg, Holland, Poland, Dresden, Wittenberg, and Leipzig.

The fourth period begins with 1620 and ends with 1774. After the battle at the White Mountain, the whole Bohemian nation submitted entirely to the conqueror. The population of most of the cities and of whole districts migrated in order not to be false to their faith. More than 70,000 men, and almost the whole of the nobility, all the Protestant clergy, scholars, and artists, in general the most cultivated part of the nation, left their native country. Of these emigrants the greater part formed the flower of the army of Count Mansfield. Hence the Thirty Years' war depopulated Bohemia more than any other country, since these fugitives endeavoured to regain their native country by repeated invasions. Nothing, however, was so disadvantageous to Bohemian literature as the introduction of monks, who were mostly Italians, Spaniards, and Southern Germans, who condemned every Bohemian work, as heretical, to the flames, so that individuals boasted of having burned about 60,000 manuscripts, which they took from the people by force, after searching their houses. Such works as escaped the flames were shut up in monasteries, in carefully-secured rooms, fastened with iron grates, doors, locks, bolts, and chains, and often inscribed with the warning title *Hell*. Instead of these excellent remains of the classical times of the country they gave the Bohemians nonsense of all kinds; accounts of hell and purgatory, the reading of which made many of the populace maniacs; though even this stuff was in many cases burned and mostly forbidden. The fugitives established at Amsterdam, Dresden, Berlin, Breslau, and Halle printing-presses, and sent to their brethren in Bohemia, Moravia, and Hungary a number of books, mostly new editions. Some Bohemians who observed the decay of their language strove to remedy it; as Pesina Z. Cechorodu; Joh. Beckowsky, who continued the Bohemian history to 1620; W. Weseley, who wrote a work on geometry and trigonometry, &c.; but the decay was too great to admit of being checked; the nobility had become strangers, and the government encouraged only German literature. From this time, therefore, the Bohemians wrote more in the German language.

In the fifth period, from 1774 to the present time, a new ray of hope shone on Bohemian literature, when, under the Emperor Joseph II., a deputation of secret Bohemian Protestants, trusting to his liberal views, made him acquainted with the great number of their brethren of the same faith. He perceived

the necessity of introducing toleration, and hundreds of thousands of Protestants in Bohemia and Moravia came to light: their concealed works were printed anew, their classical language was again acknowledged and cultivated. This is done still more under the present government, who perceive the necessity and utility of the Slavonian language, of which the Bohemian is the written dialect. Under this protection many men of merit, mindful of the fame of their ancestors, have endeavoured to cultivate anew all branches of the sciences, and to reach, if possible, their more advanced neighbours. In particular, the members of the Bohemian Society of Sciences, of the National Museum, founded in 1818 at the suggestion of Count Kollowrath-Liebsteinsky and Count Caspar of Sternberg, deserve to be named with high respect.

Since about the year 1856 a new life has been infused into the Bohemian literature. About that time numerous highly cultivated poets and prose writers appeared, the most celebrated of whom was the poet Karl Hyneck Masha, the leader of the so-called romantic or young Bohemian school. By means of this school the Bohemian drama began again to flouriah, and already nearly all the plays of Shakspeare exist in good translations in the Czech language. One of the most recent classical works is Schafarik's Slavonic Antiquities (second edition, three vols., Prague, 1863–4). Important contributions to the history of the earlier Bohemian literature have recently been made by Julius Feisalik. The best Bohemian grammars are those of Negedly and Dobrowski, and the best dictionary that of Jungmann (five vols., Prague, 1835–9). Compare Jungmann's Vollständige Böhmische Literatur (Prague, 1825).

BOHEMOND, Marc, son of the Norman adventurer Robert Guiscard, who rose to be Duke of Apulia and Calabria, was born about 1056; died 1111. He became familiar with warfare when a mere boy, and having been early intrusted by his father with military command, gave proof of a rare combination of prudence and valour. He took a prominent part in various expeditions to Greece and Illyria against Alexis Comnenus, and repeatedly defeated his troops with a very inferior force. As eldest son Bohemond naturally expected to succeed his father, but when the succession opened in 1085 Bohemond was absent in Greece, and his younger brother Roger, having obtained possession of the paternal inheritance, declared his determination to maintain it. A war ensued between the brothers, but was soon followed by an arrangement which gave Bohemond nothing more than the principality of Tarentum. His ambition was too great to be confined within such narrow limits, and he resolved to try his fortune in the East as a Crusader. When this resolution was taken he was assisting his brother at the siege of Amalfi, and without waiting to complete it harangued the troops so effectually on the glory to be gained in the Holy Land that the great body of them at once joined his standard. Bohemond was soon on his march, and after encountering considerable difficulties reached the scene of action. The Crusaders had laid siege to Antioch, but had made little progress, and were beginning to despair of success when Bohemond found means to gain over an Armenian renegade, who undertook to introduce him and his men by night, and thus give them possession of the town. Bohemond laid the matter before his fellow-chiefs, and in doing so stipulated that in the event of success he himself should be Prince of Antioch. The Armenian kept his promise, and accordingly in 1098 Bohemond was installed in his sovereignty. Though he experienced many vicissitudes he retained it ever after, and at his death in 1111 transmitted it to his son, who assumed the title of Bohemond II.

BOHLEN, Peter von, one of the most learned and talented orientalists of recent times, was born at Wüppels, in Oldenburg, in 1796; died in 1840. He spent the first twenty years of his life in straitened circumstances. His father, who was merely a mechanic, could do nothing for the education of his son, and the early death of both parents having left him absolutely homeless, he had no alternative but to apply for service. His master was a French general, whom in 1814 he accompanied to Hamburg. Here his talents and perseverance in labouring to obtain instruction under the most untoward circumstances attracted attention, and by the exertion of several humane individuals he obtained admission to the Hamburg gymnasium. After finishing his course there he was enabled by a similar act of benevolence to proceed to the University of Halle, where, under Gesenius and Hoffman, he gave his attention particularly to oriental literature. In 1822 he went to Bonn, where he studied Arabic and Persian under Freitag, and Sanscrit under Schlegel. His proficiency now entitled him to become a teacher, and he obtained an appointment at Königsberg, first in 1825 as extraordinary, and afterwards in 1830 as ordinary professor of oriental literature. The unhealthy air of Königsberg and excessive study undermined his constitution, and after returning from a journey to England, undertaken at the expense of the Prussian government for the purpose of purchasing oriental MSS., he found it necessary to go to the S. of France in 1838. He returned with health considerably improved, but still so precarious that, instead of going again to Königsberg, he fixed his residence first at Bonn and then at Wiesbaden. After the death of his wife in 1839, which destroyed all hope of recovery, he removed to Halle, where he died. Bohlen has left many works, which fully support his title to the high place which he held among oriental scholars. One of the most important of his writings is a work entitled Das alte Indien, which has not yet been superseded by any other work on the same subject. The details of his life are given with great minuteness and honesty in an Autobiography, which is full of interest, and cannot be read without producing a full conviction that he was no less distinguished by his amiability in private life than by his literary acquirements.

BOIARDO, Matteo Maria, Count of Scandiano, was born at a seat belonging to his family near Ferrara in 1434. From 1488 to 1494, the period of his death, he was commander of the city and castle of Reggio, in the service of his protector, Ercole d'Este, duke of Modena. This accomplished courtier, scholar, and knight was particularly distinguished as a poet. His Orlando Innamorato (Scandiano, 1496) is continued to the seventy-ninth canto, but not completed. He immortalized the names of his own peasants and the charms of the scenery at Scandiano in the persons of his heroes and his descriptions of the beauties of nature. In language and versification he has been since surpassed by Ariosto, whom he equalled in invention, grace, and skilful conduct of complicated episodes. Domenichi, Berni, and Agostini new modelled and continued the work of Boiardo without improving it. One continuation only will never be forgotten—the immortal Orlando of Ariosto. In some of his works Boiardo was led by the spirit of his times to a close imitation of the ancients—for example, in his Capitoli; also in a comedy borrowed from Lucian's Timon; and in his Latin eclogues and translations of Herodotus and Apuleius. In his sonnets and *canzoni* (first printed at Reggio, 1499) he has displayed great talents as a lyric poet.

BOIELDIEU, Adrien François, a celebrated composer, born at Rouen in 1775; died in 1835. He early displayed great musical talent, and at eighteen

wrote an opera which was performed with great applause. In 1795 he repaired to Paris, and rose rapidly in reputation, producing several operas and various other pieces which have become classical. When the Conservatoire de Musique was established he was nominated a professor. In 1803 he went to Russia as Maître de Chapelle to the Emperor Alexander, but returned to Paris in 1811, where, among others, he produced the Dame Blanche, which is regarded by many as his masterpiece.

BOII, a Celtic people, who at first inhabited Transalpine Gaul. Their original seat is not exactly known, but it is supposed to have been near the territory of the Lingones, that is, between the Upper Saône and the higher parts of the Seine and Marne. They migrated to Cisalpine Gaul, crossed the Po, and established themselves between it and the Apennines, in the country previously occupied by the Umbrians. They are found, B.C. 396, engaged along with the Insubres and the Senones, two other tribes of Cisalpine Gaul, in the capture and destruction of Melpum, a neighbouring city, of which the site and history are unknown. They are said to have taken part in an expedition of the Gauls into Latium, which was defeated, B.C. 358, by the dictator C. Sulpicius. They united their forces with the Etruscans, B.C. 283, after the defeat of the Senones, and were defeated by the Romans at the Vadimonian Lake, the scene of a previous defeat of the Etruscans. After another defeat they made a peace with the Romans, which was preserved for forty-five years, when the occupation of the territory of the Senones by the latter led to another war, in which the Boii were again defeated. At the commencement of the second Punic war, B.C. 218, they again attacked the Romans and supported Hannibal. From this period they were engaged in almost constant war with the Romans till they were completely subdued by Scipio Nasica, B.C. 191. They were deprived of a great part of their territory, and many of them put to the sword. The remainder were at length compelled to migrate, and crossing the Alps they found a refuge among the Tauriscans, a kindred tribe who had established themselves in the territory of modern Bohemia, to which the Boii have given their name. They were afterwards driven out or exterminated by the Dacians (some say the Marcomäns). Part of them migrated about B.C. 58 to Bavaria. The Boii, like the other Gauls, were a people of considerable civilization, possessing a strong love of independence, and formidable from their military disposition and virtues.

BOIL, to heat a fluid up to the point at which it is converted into vapour. The conversion of the fluid into gas takes place chiefly at the point of contact with the source of heat, and the bubbles of vapour rising to the surface, and breaking there, produce a lively commotion, attended with a slight noise, which is called ebullition. The escape of the heated fluid in the form of vapour prevents any further rise of temperature in an open vessel, when the boiling-point has been reached. The boiling-point of a fluid thus acquires a scientific importance. According to Tyndall, the exact definition of the boiling-point of a liquid is 'that temperature at which the tension of its vapour exactly balances the pressure of the atmosphere.' Tyndall found the boiling-point of water at the summit of Mount Rosa to be 184·92°, of Mount Blanc 184·95°. Spirits boil at the lowest temperature, pure water next, the fixed oils still higher. Water freed of air has its tension so much increased as to resist boiling for 100° Fahr. above the usual boiling-point. The boiling-point of water under the common pressure is one of the fixed points in the gradation of the thermometer. In Fahrenheit's thermometer it marks 212°, in the Centigrade 100°, and 80° in Réaumur's. This point is uniform only in case of complete boiling, and under a uniform pressure of the atmosphere. The influence of this pressure appears from experiments. In an exhausted receiver the heat of the human hand is sufficient to make water boil; while, on the contrary, in Papin's digester, where the confinement prevents evaporation, it may be heated to 300° or 400° without boiling. Under the common pressure of the atmosphere, the boiling-point of alcohol is 176°; that of mercury, 662°; that of sulphuric ether, 96°; that of oil of turpentine, 316°; that of sulphuric acid, 620° Fahr. From the experiments of Professor Robinson, it appears that in a vacuum all liquids boil about 145° lower than in the open air, under a pressure of 30 inches of mercury; water, therefore, would boil in a vacuum at 67°. Ether may be made to boil at the common temperature by merely exhausting the air from the vessel in which it is contained.

BOIL. A boil is a small tumour of a conical shape, elevated above the surface of the body. Its base is hard, while its apex is soft, of a whitish colour, and exceedingly painful. The pain in boils is generally severe and burning, and hence the name. Boils generally occur in persons of unhealthy constitutions, in those of intemperate habits, and they often arise from, or at least follow, disease of the digestive organs. They vary considerably in size. In treating a boil suppuration should be stimulated by poultices and fomentation; afterwards a free crucial incision should be made into the tumour, and the matter, together with the dead cellular tissue, or core, as it is called, must be forcibly squeezed out. If the core is adherent it must be destroyed by caustic, as it otherwise tends to keep up irritation. Attention must also be paid to the digestive organs. If these are much deranged, an emetic should first be given, followed by some gentle purgative. Afterwards Plummer's pills (calomel, antimony, and guaiacum), followed by small doses of Epsom salts, may be given occasionally. Anodynes are sometimes necessary when the constitutional irritation is very great.

BOILEAU-DESPRÉAUX, NICHOLAS (commonly called *Boileau*), a French poet, born in 1636, at Crosne, near Paris; died 1711. He commenced his studies in the Collége d'Harcourt, and continued them in the Collége de Beauvais. Even in his early youth he read with ardour the great poets of antiquity, and tried his own powers in a tragedy, though with little success. After having completed his academical studies, he entered upon the career of the law; but soon left it from disinclination, tried some other pursuits, and resolved, finally, to devote himself entirely to belles-lettres. His first satire, Les Adieux à Paris, made known his talents. In 1666 he published seven satires, with an introduction, addressed to the king. They met with extraordinary applause, for no one before him had written with such elegance of versification. But in this, and in the purity of his language, and the clearness with which he sets forth his luminous principles, consists their chief merit; profound or original ideas we should look for in vain, though the pieces are not destitute of graceful touches and delicate strokes. They are unequal in merit. The satires Sur l'Équivoque and Sur l'Homme have undeniable defects. That on women, which he wrote at a more advanced age, is monotonous, and deficient in humour. His epistles, in which he is the successful rival of Horace, are more esteemed at the present day. They display a graceful versification, a natural and sustained style, vigorous and well-connected ideas. These were followed by his Art Poétique, in which he describes with precision and taste all the different kinds of poetry (with the exception of the apologue), and lays down rules for them. In regu-

larity of plan, happy transitions, and continued elegance of style, this poem is superior to the Ars Poetica of Horace. It was long regarded, not only in France, but also in foreign countries, as a poetical code, and has everywhere had a favourable influence, as it inculcates purity and regularity, and subjects all the productions of poetical genius to a fixed standard. Boileau-Despréaux's censures of Tasso and Quinault, with some other equally unfounded opinions, display a narrowness of spirit. He had many opponents, who accused him of want of fertility, invention, and variety. To refute them he wrote his Lutrin, a mock heroic poem, which is still unrivalled in the eyes of the French. A music-stand, which has been removed from its place, had occasioned dissensions in a chapter: this is the subject of Boileau-Despréaux's poem, in which his art of making petty details interesting deserves as much praise as the other excellencies of his poetry already enumerated. In his life, Boileau-Despréaux was amiable and generous. Louis XIV. gave him the place of historiographer, in connection with Racine, with whom he maintained the most friendly relations throughout life. They frequently submitted their works to each other for revision. The correspondence of Racine and Boileau-Despréaux is included in the collected works of both writers. As Boileau-Despréaux had attacked the academicians in several of his writings, he was not received into their society until 1684, and then only by the interference of the king. He died of dropsy. M. de St. Surin has published Œuvres de Boileau, with a commentary, Paris, 1821–3, four vols. An edition edited by St. Prix, also in four vols., has appeared in Paris in 1830; another by the same editor, with notes of all the commentators, in 1860.

BOILER, the name applied to any vessel or cauldron for boiling large quantities of liquor, but most commonly used as the designation of a metallic vessel, in which water is converted into steam by the action of fire, the steam being intended by its expansive force to give motion to the piston of a steam-engine, or to be used for a variety of manufacturing purposes. A very common construction of boiler is that which consists of an outward shell inclosing the furnace, combustion chamber, boiler tubes or flues, smoke-box, &c., and having the steam-chest placed on the top of it. Boilers with a large number of these internal tubes are called multitubular. It is not absolutely necessary that the boiler should inclose the furnace and its connected tubes; but as it is of the utmost importance to obtain the largest extent of heating surface with the smallest expenditure of fuel, this is one of the most common forms of the boiler, and is the only one used for marine engines. The shell of the boiler usually consists of iron plates rivetted together, sometimes of sheet copper, and in recent times occasionally of steel plates. Cylindrical or spherical boilers, or parts of boilers, are the strongest naturally, and parts that deviate considerably from these shapes require to be strengthened by ties or struts. About $\frac{5}{8}$ths of an inch is the thickness usually given to iron boiler-plates of the low-pressure description; but the flat ends of cylindrical boilers must be made one-half thicker than the body. Steel boilers, however, do not require to be of so great a thickness, the tenacity of steel being 1·6 that of iron. The furnace or fire-box possesses a *grate*, or grated bottom, consisting of wrought-iron bars placed a very short distance apart, and supported with suitable bearers.—The *fire-door* closes the opening through which the furnace is fed with fuel, and is pierced with a number of small holes, for the admission of air above the fuel to assist combustion.—The *dead plate* is fitted to the furnace front, and is mainly used for supporting the bars. In land boilers this plate is made of great breadth, the fresh coal is laid on it, and pushed forward as the fuel is consumed.—The *ash-pit* is immediately under the fire-grate; the front is fitted with hinge-doors to regulate the admission of air underneath the grate, and to act as a damper when required.—The *bridge* is a vertical wall placed at the back of the furnace bars, over which the flame passes on its way to the chimney.—The *flame-chamber*, behind the bridge, the flues, and tubes passing through the boiler, are traversed by the flame and heated gases from the furnace, and thus the water in the boiler is exposed to a large extent of heating surface.—The *smoke-box* is intended to receive the waste heat which is taken advantage of in superheating the steam.—The tubes passing through the boiler have their ends fitted into the *tube-plates*, which are placed at the front and back of the boiler; the holes for the tubes are accurately set out and drilled; the tubes are fitted tightly, and are then expanded with a tool for the purpose.—The *manhole* is an opening placed at the most convenient part of the boiler, intended to admit a man into the interior of the boiler for inspection and cleaning.

The boiler is supplied with water by means of a pump worked by the engine; there is likewise a steam pump provided for filling the boilers when the engine is not working. In locomotives and in some other engines the pump is dispensed with, and the *injector* is used to throw the water into the boiler. There is, however, this disadvantage attending the use of the injector, viz. that the water supplied by it is cold, while the steam pump can throw water into the boiler at nearly the boiling-point, thus effecting a saving in fuel.—The steam-pipe conducts the steam from the boiler to the engine, and is fitted with a valve, called the *throttle-valve*, for regulating by hand the supply of the steam. Before the steam is conducted to the engine it passes into the *steam-chest*, where it deposits any watery particles it may have taken up.—There are generally one or two *safety-valves* fitted to each boiler, the use of which is to allow the steam to escape when the pressure becomes too great. In marine boilers these are circular valves, held down by weights suspended from them inside, and having a lever and shaft, with handle outside the boiler for lifting the valves by hand. For stationary land boilers the safety-valve is held down by means of a loaded lever, with a weight that can be adjusted at pleasure; while for locomotive boilers a spring and lever is used, with thumb-screw for compressing or releasing the spring when the full pressure is required, or when the steam requires to be blown off.—The *vacuum-valve* is a valve fitted to flat-shaped boilers; it opens inwards to admit the air, and prevent the possibility of the boiler collapsing, in case the pressure of the steam within should fall below the pressure of the atmosphere without. The *pressure-gauge* indicates the difference between the pressure of the steam in the boiler and the atmospheric pressure. The gauge most generally used is Bourdon's. It consists essentially of a curved, flattened tube, into which the steam is admitted, and which becomes more or less curved, according as the pressure is less or greater.—The *water-gauge* shows whether the water in the boiler is kept high enough. For this purpose there is generally a cast-iron pipe projecting from the front of the boiler, extending from the steam space to about the crown of the furnace; it is fitted with a strong vertical glass-tube, communicating by means of plug-taps and other connections with the water in the boiler, and thus clearly showing its height.—Marine boilers are supplied with *scum* and *blow-off cocks*. The former is connected with an internal pipe, having a trumpet mouthpiece for collecting the scum and froth, and

with an external pipe for blowing it overboard; while the blow-off cock allows the brine to escape through the bottom of the ship, which is fitted with a valve termed the Kingston valve.—The *clothing* of a boiler is an outer casing of some non-conducting substance, to prevent the radiation of heat from the boiler. One of the substances most commonly used is felt, which is covered with lagging, or narrow strips of wood, secured to the boiler with screws, while over all there is laid a casing of lead to prevent moisture affecting the plates. Land boilers are protected with a covering of fire-brick, felt, or other non-conductor, and in some instances sand is used with advantage.

There are a variety of boilers now used for land engines. Plain cylindrical boilers with hemispherical ends are the most common, and far outnumber any other form in use. Their construction renders them very strong, as the whole of the iron is subjected to tensional stress. The boiler rests on a structure of brick-work, having the furnace underneath, with a return flue all round, which is lined with fire-bricks, so as to resist the action of the flame.

The Cornish boiler differs materially from the foregoing, having both ends quite flat, with one or more internal flues running through and through, the furnaces being placed in the flues, with return flues all round. Others have two furnaces meeting in one combustion-chamber, which allows of alternate firing, a plan well calculated for the prevention of smoke nuisance. The internal flues are usually stayed with a number of conical stay tubes, with the water freely passing through them. The flame warps around these tubes, and is thus broken up and its passage delayed, so that the gases are thoroughly mixed, and, along with the smoke, are fully utilized for heating purposes. All these boilers require to be bedded in brick-work, and surrounded with flues built of the same material; there are, however, many horizontal self-contained boilers used for land purposes, chiefly consisting of the locomotive class, having no outward flues.

The locomotive boiler has an inside fire-box made of copper, which is surrounded with an outside shell of wrought iron, leaving a water space all round. This is closed at the bottom with a bar of wrought iron, or a flanged plate, which unites the inside and outside shells together; the bottom of the inside fire-box being of course quite open for the reception of the fire-bars. As the water space round the fire-box is in free communication with the other parts of the boiler, the sides and top are subjected to the full steam pressure, which tends to collapse the inside box, and burst the outside shell; consequently the flat sides require to be securely stayed, as likewise the top of the inside fire-box. The body of the boiler is of a cylindrical form, securely rivetted to the fire-box at one end, having a tube-plate at the smoke-box end; between this tube-plate and the fire-box small brass tubes are arranged, honey-combing, as it were, the water space in the body of the boiler, and giving hundreds of square feet of heating surface. By this means the flame and heated gases pass from the fire-box through the tubes, and thus supply heat to the water in the boiler, while the waste heat passes into the smoke-box, and then up the chimney. A draught is created in the chimney by means of the waste steam from the cylinders, which rushes into it through a pipe, and so creates a partial vacuum. To effect the complete combustion of the coal in the locomotive boiler, various arrangements are in use. Among these, currents of air, inducted by means of steam, and entering the fire-box above the coal, have been tried with success. The air is inducted through stay-tubes placed on the sides of the fire-box, between the inside and outside shells; a pipe fitted with small nozzles is arranged in connection with the stay-tubes, these nozzles being just so many miniature steam blast-pipes, and acting in the same way as the main blast-pipe placed in the chimney. Each by creating a partial vacuum, induces a current of air to pass into the fire-box, and thus supplies the oxygen of the atmosphere, so necessary to effect complete combustion. Other arrangements aim at delaying the flame in the fire-box. With that object in view, the fire-box is made longer, projecting into the body of the boiler, and has a separate combustion-chamber in front of it. The flame and heated gases pass through tubes, or apertures formed with fire-brick tiles, placed between the fire-box and combustion-chamber; and these fire-brick tiles having the property of retaining the heat when the fire is bright, and giving it off when the fire is dull, or in the act of firing, thus serve as equalizers of temperature. In some cases air is admitted through stay-tubes in the front of the fire-box, which flows in with considerable force when the engine is running; while nearly all the fire-doors in the locomotive boiler are pierced with a number of small holes through which the air flows in, and is then deflected on the top of the fuel with a baffle-plate.

Another form of boiler extensively used for general purposes is the vertical type, arranged with tubes, flues, pots, &c. These boilers are of a cylindrical form and quite self-contained, and as such they are very convenient where space is an object, and, moreover, they are very strong and capable of bearing great pressure. Water-tube vertical boilers have met with much favour. A series of small tubes, hermetically sealed at bottom, are fitted to the tube-plate, passing downwards into the fire-box, and having an internal tube in each. By this arrangement only a thin film of water is exposed to the heating-surface. As the steam globules are formed, they ascend, displacing the water in the annular space; while the water at the top descends through the internal tube and fills up the cavity. The chimney in these boilers is placed at the centre; there is a large aperture at the centre of the top of the fire-box for the uptake leading to the chimney. This leaves a centre space which is not filled up with tubes, so it is necessary to suspend a fire-brick lump from the top of the uptake. Thus the flame is distributed amongst the tubes, otherwise a great part of the heat would pass up the chimney to waste.

Other boilers of this class are not inclosed in a metallic shell, the tubes being much larger, and so connected as to form a series of boilers, the whole being encased with brick-work, furnace, flues, &c. These tubes are capable of sustaining great pressure, and it is considered they tend greatly to the prevention of serious boiler explosions, as in all probability one tube would give way before the others, thus relieving the boiler from pressure.

Flue-boilers, or boilers with large heating-tubes, for marine purposes, have become a thing of the past, although at times they are used for dredging-vessels, the feed-water being generally very muddy, and flue-boilers having an advantage in being more easily cleansed from deposit. For ocean steam-ships a species of overhead flue-boiler has been extensively used. The flues are quite narrow, formed of plate-iron strengthened with stays a few inches apart. These stays act as heat-conductors to a considerable extent. The furnaces are placed underneath the flues, as in ordinary multitubular arrangements, and are generally made quite round.

The multitubular-boiler is certainly the greatest improvement we have had in steam producers, and has conduced in a great measure to the success of the mercantile marine, as well as having been of the ut-

most advantage to the royal navy. For the latter there are two classes, high and low, the former having the tubes arranged over the furnaces, the latter having them arranged alongside, the top row being level with the crown of the furnaces. This arrangement is adopted for vessels of light draught of water, so as to get the top of the boiler at least 1 foot below the water-line. The shell, furnaces, and other parts of these boilers require to be very strongly stayed, owing to their rectangular form, which is adopted to suit the bilge of the vessel.

For high and low pressure combined marine-engines, round boilers are now extensively used, with tubes on the return principle. The shell and furnaces are quite round, and are capable of sustaining, without stays, the great steam-pressure now universally acknowledged as the one thing needful to effect a saving in fuel. But all the flat parts of these boilers require to be very strongly stayed, in a similar manner as the locomotive boiler. The uptake, or part above the boiler for conveying the smoke into the chimney, is of a circular form, detached from the boiler. The steam is admitted inside, and is superheated in its passage to the cylinder of the steam-engine.

BOIS DE BOULOGNE, a pleasant grove near the gates of Paris, mentioned in many of the French romances. The greater part of the old trees were destroyed during the revolution. When Napoleon chose St. Cloud for a summer residence, he ordered young trees to be planted, had the place inclosed with a wall, and the wood stocked with game, so that it became more a place of resort than before. In 1815 the British troops under the Duke of Wellington were stationed in it, and cut down the most beautiful trees, old and young, for barracks. For a long time it has been the duelling ground of the Parisians. It is also one of the gayest holiday promenades. During the Franco-German war of 1870–71, a large number of the trees were cut down by the French in preparing for the defence of Paris. In the time of the disturbances of the Commune in 1871, several sanguinary encounters took place here.

BOIS-LE-DUC (the French name for the Dutch *Hertogenbosch*, or *Den Bosh*), a fortified city, North Brabant, in Holland, 49 miles S.E. Amsterdam, with 24,315 inhabitants, at the confluence of the Dommel and the Aa, which form, by their junction, the Diest. Lon. 5° 18′ E.; lat. 51° 41′ N. It has many manufactories, and much trade in corn, some saltworks, a lyceum, an elegant town-hall, and numerous schools. Godfrey, duke of Brabant, founded this important military post in 1184. The fortifications now consist of strong walls and seven bastions, but it owes its security chiefly to the facility with which the whole country around can be laid under water (the new canal to Maestricht has sixteen sluices). Bois-le-Duc is defended by several forts and a citadel, and has four gates, besides three entrances from the water. The cathedral is one of the finest in the Netherlands. The city suffered much in the religious wars of the sixteenth century, and fell into the hands of the Dutch in 1629. September 14, 1794, the French defeated the English here; October 9 of the same year it surrendered to Pichegru. In January, 1814, it was taken by the Prussian general Bulow.

BOISSERÉE. A celebrated gallery of pictures exhibited in Munich, which was collected by the brothers Sulpice and Melchior Boisserée, and John Bertram, men who, animated by love of the arts, began, at the time of the destruction of the monasteries, during and after the French revolution, to purchase old pictures, and afterwards completed their collection by the addition of many valuable paintings of the old German school. By this collection the brothers Boisserée and Bertram have happily realized the idea of an historical series of old German paintings. It is to their endeavours that we owe the discovery that Germany possessed, as early as the thirteenth century, a school of painters of much merit, which, like the Italian, proceeded from the old Byzantine school, but became, in the sequel, distinguished by excellences of its own. We owe to these collectors, also, the restoration to favour of the forgotten Low German masters, and a just estimation of John van Eyck, as the creator of the genuine German style of painting. The most distinguished connoisseurs and artists, including Goethe, Canova, Dannecker, and Thorwaldsen, have strongly expressed their admiration of this collection. It was first brought together and exhibited at Heidelberg, but not finding sufficient conveniences there for their exhibition, the brothers Boisserée and Bertram removed it to Stuttgart, where the King of Würtemburg assigned them a suitable building. The collection remained there till 1828, when it was removed by King Louis of Bavaria, who had purchased it in the previous year for 120,000 thalers, to Schleissheim, where it remained till 1836, when most of the paintings were sent to the picture-gallery of Munich. A lithographic work on this collection was published in forty parts at Stuttgart and Munich, between 1821 and 1840.

BOISSIEU, JEAN JACQUES DE, born at Lyons in 1736; died 1810. He was intended by his parents for the magistracy, but manifested such a decided inclination for drawing that he was allowed to follow it. After remaining for some time at Lyons, and painting some excellent imitations of the Flemish school, he visited Paris, where his intimacy with the most celebrated artists of the time enabled him greatly to improve his style. On his return to Lyons he devoted his attention chiefly to engraving. He afterwards accompanied the Duc de Rochefoucauld to Italy, and having studied the works of the great masters with the greatest assiduity, resumed painting; but as the use of oil injured his health, he, shortly after his return to France, abandoned it finally for engraving, in which his reputation soon became European, and his works were eagerly purchased by the most wealthy and distinguished amateurs. His engravings amount to 107 plates, among which that of Le Charlatan, after a picture by Karel Dujardin, is considered his masterpiece.

BOISSONADE, JEAN FRANÇOIS, a French classical scholar, celebrated for his editorial labours, born 12th August, 1774; died in 1857. He was descended of a distinguished family, and several of his ancestors had gained a reputation as men of letters. He was left an orphan at an early age, and his patrimony was dissipated by the negligence of his guardians. He was educated at the College of Harcourt, and at the age of eighteen was attached to the ministry of foreign affairs. In 1801 Lucien Bonaparte named him secretary-general of the prefecture of the department of Haute-Marne, but the temper of his superior soon compelled him to give in his resignation, and he abandoned public life. He had already become a contributor to periodical literature in the Magasin Encyclopédique of Millin and the Journal de l'Empire, the precursor of the Journal des Débats. Ancient and modern literature, both French and foreign, grammatical criticism, bibliography, and natural sciences occupied his pen. His career as a journalist extended to 1813, at which date he was admitted a member of the Academy of Inscriptions and Belles-Lettres. He afterwards wrote about 150 articles for the Biographie Universelle. He was offered the chair of Greek literature

at Genoa, and afterwards the rectorship of the Academy of Strasburg, but preferred to continue his studies among the manuscripts of the imperial library. He became in 1809 assistant of Larcher, as Greek professor of the Faculty of Letters in Paris, and four years afterwards he succeeded him both in the Faculty and in the Institute. Finally, in 1828, he was called to the chair of Greek literature in the College of France. From this time he devoted himself entirely to his duties as a professor, and his labours as a classical editor. He has produced no complete work in French, but is said to have written Latin with natural grace and elegance, and his editions of the classics are highly esteemed. His editorial labours were also extended to a few French works, and he translated a heroi-comic poem, the Genpillen, from the Portuguese.

BOISSY D'ANGLAS, FRANÇOIS ANTOINE, COMTE DE, a French statesman of the revolutionary period, was born at Saint Jean-la-Chambre, near Annonay, in 1756; died at Paris, 20th Oct. 1826. He studied at Annonay, and was admitted as an advocate to the parliament of Paris. In 1789 he was elected at Annonay to the states-general, where he was a moderate advocate of revolutionary principles, in support of which he wrote at this time various brochures. In 1792 he was returned as a deputy to the Convention. He voted against the death of Louis XIV., and after the fall of Robespierre he was appointed secretary of the Convention, and a member of the Committee of Public Safety, and intrusted with the provisioning of Paris at a time of famine, a task which he does not appear to have executed satisfactorily. He was made a member of the Council of Five Hundred in 1795, president of the Tribunate in 1803, senator and commander of the Legion of Honour in 1805, was created a peer by Louis XVIII. in 1814, but supported Napoleon during the Hundred Days, and was consequently expelled from the peerage by a royal ordinance, but shortly afterwards reinstated. He was from 1803 a member of the consistory of the Reformed Church, a member of the Institute from its commencement, and on its reconstruction in 1816 he became a member of the Academy of Inscriptions. He wrote an essay on the life and writings of Malesherbes (Paris, 1819–21); Etudes Littéraires et Poétiques d'un Vieillard, five vols. duodecimo, Paris, 1825.

The fame of Boissy d'Anglas rests chiefly on a scene in the Convention in 1795, when the hall was invaded by an angry mob, demanding bread and the constitution of 1793. Called temporarily to take the chair, in the absence of the president, Boissy had presented to him the head of a deputy, Féraud, which had been cut off by the insurgents and placed on the end of a pike. He saluted it, and continued calmly facing the mob, and to his courage and firmness the safety of the Convention at this crisis is attributed. Such is the popular version of a story of which the most various and contradictory accounts are given. It has been said that Boissy d'Anglas exhibited no such courage as has been attributed to him, and that he was merely kept in his place by the pressure of the mob. His enemies, who accused him of reactionary tendencies, even said the insurrection was got up by the reactionary party to discredit the revolution, and that Boissy was in understanding with the leaders of the mob. For this last accusation there appears to be no foundation, but it is quite likely the scene may have been represented in a more dramatic form than as it actually occurred.

BOJACA, BATTLE OF, so called from having been fought near the bridge of the small town of Bojaca, not far from the city of Tunja, between the Spaniards under Barreyro, and the united forces of Venezuela and New Grenada commanded by Bolivar. It occurred August 7th, 1819, and was decisive of the independence of New Grenada. Among the republicans, Generals Anzuategui, Paez, and Santander distinguished themselves; and the Spaniards sustained a total defeat, their general, most of their officers and men who survived the battle, together with all their arms, ammunition, and equipments, falling into the hands of Bolivar. So complete was the destruction of the Spanish army, that the viceroy instantly fled from Santa Fé, leaving even the public treasure a prey to the conquerors.

BOJADOR CAPE, a promontory, W. coast of Africa; lat. 26° 7′ 10″ N.; lon. 14° 29′ W.; is one of the projecting points of the great desert of Sahara, and forms the W. extremity of a rocky ridge called the Jebel-khal or Black Mountain. The coast N. of this cape is extremely dangerous, being shallow to a great distance out, and constantly enveloped in a haze. It has been, in consequence, the scene of many a melancholy disaster. Cape Bojador was long the limit of navigation towards the S. and was first passed by the Portuguese in 1433.

BOJANO, a town of Naples, in the province of Molise, 10 miles S.W. of Campobasso. It is situated on the Bijerno, in a defile at the foot of Mount Matese. It is the seat of a bishop, and has a cathedral and several churches. Bojano is chiefly distinguished as the site of the ancient Bovianum. Pop. 2981.

BOKHARA, or BOCHARA, an independent khanate of Central Asia, bounded on the N. by the desert of Kizil Kum, on the W. by the khanate of Khiva, on the S. by Affghanistan and Balkh, and on the E. by Hissar, Shehri-Sebz, and Russian Turkestan. It formerly occupied considerably more territory than it does now. Since the conquest of the valley of the Zerafshan, along with Samarkand and Katti Kurghan, by the Russians in 1868, the area has been about 100,000 square miles. The country is to a great extent occupied by deserts, and low and naked ranges of mountains, and the cultivated portions of it are confined to the valleys of the rivers, especially the Oxus or Amoo Daria, which flows from S.E. to N.W. through the S. of Bokhara and the Zerafshan, which coming from the E. waters the neighbourhood of the towns of Samarkand and Bokhara. Although it lies between 36° and 44° N. lat., and is no more than 1100 or 1200 feet above the level of the sea, the climate is even in warm summers very cold, and sometimes snow lies on the ground to the depth of 1 foot. On the other hand there is very little rain, on which account it is necessary to resort to artificial irrigation in order to fertilize the fields. Besides cereals, cotton, tobacco, and vegetables are cultivated, and there is also a good deal of fruit. The pop., inclusive of the nomadic hordes, amounts to about 2,500,000, and consists of the Uzbecks, who are the ruling race, and to whom the emir belongs; the Tajiks, who form the majority in the capital; the Kirghizes, less numerous than the Tajiks; about 60,000 Arabians, descendants of the soldiers who were brought into the country by the third caliph of Bagdad on the occasion of the conquest of Turkestan; Persians, who have chiefly been brought as slaves to Bokhara; Turcomans, Hindoos, and about 10,000 Jews who live in the towns beyond the protection of the law, and accordingly oppressed by the other inhabitants. Since the separation of Samarkand there are now only two towns of any importance in Bokhara, namely, the chief town Bokhara, with a pop. of about 70,000; and Karshi, with about 25,000. Besides these there are a few small towns and some hundred villages in the country. The capital, according to Vámbéry the centre of Tartar civilisation, is ill-built

and has a gloomy aspect, and in luxury of dress and mode of life is far behind the towns of Western Asia. Among the people there reigns the utmost moral corruption along with a rigorous adherence to outward forms. The country is distinguished from the other countries of Central Asia by its numerous schools, and in the same proportion by the amount of culture diffused among the people generally; but the women are even more degraded than in other Mohammedan countries. The rule of the emir is absolute, although he is to some extent under the influence of the clergy. The manufactures are unimportant, but there is a very considerable caravan trade, cotton, rice, silk, and indigo being exported, and woven goods, sugar, iron, &c., being imported. Above all, Bokhara is remarkable for its religious fanaticism, and on that account several of the European travellers who have recently visited the country have been exposed to great annoyance and even danger. After Alexander Burnes had visited Bokhara on a commission from the British government of India in 1832, the British ambassador in Teheran sent Colonel Stoddart in 1838 to obtain from the Emir Nasrulla the deliverance of the Russian prisoners that he had taken on his predatory incursions into Russian territory. Nasrulla, however, irritated at the neglect to answer his letter to the Queen of England, ordered Colonel Stoddart to be thrown into prison, and after treating him with great cruelty, compelled him to acknowledge the Mohammedan creed. Captain Conolly, who had been with a similar object in Khiva and Khokand, came in 1841 to Bokhara, and after having to submit to the same treatment as Colonel Stoddart, was executed along with him in 1842. Information of their fate was brought to Europe by the missionary Wolff, who had been sent to Bokhara in 1843 for this purpose. See Wolff's Narrative of a Mission to Bokhara, 1843–45 (London, 1845).

In 1850 the Russians established themselves at the mouth of the Sir (Jaxartes), where it flows into the Sea of Aral, and in 1864 they found it necessary to proceed further up the river. They made themselves masters of the two towns Turkestan and Aulie-ata, and after bringing them into communication with one another, invested Chemkend, Niazbek, and Chinab. The land thus occupied, which up to that time had formed the northern half of the khanate of Khokand, was, along with some other districts that had previously been annexed to Russia, erected into the Russian government of Turkestan, and incorporated with the general government of Orenburg, by the ukase of Feb. 14 (26), 1865. By a subsequent ukase, dated July 11 (23), 1867, this territory was constituted a general government. Soon after the Khan of Khokand invaded the Russian territory, in consequence of which the Russians advanced still further s. and attacked Tashkend, which they took on the 28th of June, 1865. They did not, however, incorporate Tashkend with the Russian territory, but declared it an independent khanate under the protection of Russia. This arrangement was opposed by Muzaffer-Eddin, emir of Bokhara, whereupon the Russian general Romanovski again assumed the offensive, and marching into Bokhara took Khojend by storm on the 5th of June, 1866. In this way Russia came into the possession of the whole basin of the Sir. Not long after Tashkend was incorporated with the Russian territory by the desire of the inhabitants. Meanwhile the war with Bokhara still went on, and peace was not concluded till the beginning of 1867. This peace, however, did not last long. The war was renewed in the spring of the following year, and it was only in July, 1868, that the terms of peace between Russia and Bokhara were finally agreed upon. Bokhara was to give up Samarkand and Katti Kurghan, along with the surrounding districts (constituting the tract of land watered by the Zerafshan), and at the same time promised to pay an indemnity to Russia and to protect her trade. Since then the peace has not been broken, but the Emir Muzaffer-Eddin has sunk more and more into a position of dependency on Russia. During the autumn, at the request of the emir himself, the Russians intervened against the emir's son, who had risen in revolt against him. The troops of the rebels were defeated by the Russian general Abramow, on the 21st of Oct., 1868, at Karshi, and on the 23d the Russian general invested that town, which was, however, afterwards restored to the Emir of Bokhara. On the 12th of Oct. in the following year the emir sent an embassy with presents (tribute) to the czar at St. Petersburg. In the meantime Muzaffer-Eddin had fallen into a dispute with Afghanistan (Cabul). Shere Ali Khan, of Cabul, had for some time given a favourable reception to the rebellious son of the emir, and Muzaffer-Eddin, probably in consequence of encouragement received from Russia, now thought himself able to make good his former claim to Badakshan, and the territory lying about the sources of the Oxus, especially since the Khan of Cabul seemed to have but a slight hold on the northern parts of his territory. He had accordingly already sent out an army with the view of conquering those parts, when, towards the end of 1869, pressure being put upon him by Russia, he concluded a treaty with Cabul by which the Oxus was fixed as the boundary of the conterminous states. By an agreement come to between Russia and England in the beginning of 1873, this boundary line was recognized by both countries. It is acknowledged that, according to this arrangement, Afghanistan gives up a small portion of its northern territory, but at the same time, by way of compensation, it gains a district that it had not previously claimed.

BOKHARA, the capital of the above kingdom, in lat. 39° 48′ N.; lon. 64° 26′ E., occupies a flat embosomed among trees, and covering an area of 8 or 9 miles in circuit. It is surrounded by a mud-wall with battlements, and entered by eleven gates. It is poorly built, consisting of extremely narrow streets and paltry houses. The principal edifices are the palace of the khan, crowning a height near the centre of the town and surrounded by a brick wall 70 feet high; and numerous mosques, the largest of which is enamelled with tiles of azure blue, and has a tower 210 feet high. The extent of the trade may be estimated from the fact that from 12,000 to 15,000 camel loads of goods annually enter the city. The pop. was estimated by Burnes in 1835 at 150,000 but is now thought not to exceed 70,000.

BOLAN PASS, a defile in the lofty mountain range of East Beloochistan, from 54 to 55 miles long, hemmed in on all sides by lofty precipices, and so narrow that a regiment could defend it against an army. In 1839 the Bengal column with its artillery passed through it in six days on the way to Cabul.

BOLBEC, a town, France, department of Seine-Inferieure, 17 miles E.N.E. of Havre; agreeably situated on the side of a hill, washed by the Bolbec, and at the junction of four valleys. It is a thriving and industrious place, and well situated for commerce. Its printed cottons and handkerchiefs have long been held in high estimation. Besides these it produces linen and woollen stuffs, lace, cotton, velvet, and thread, and has several dyeworks and tanneries, with a considerable trade in grain, horses, and cattle. Pop. 9063.

BOLE, an earthy mineral which occurs in amorphous masses, and is composed chiefly of silica with about 20 per cent. of alumina and 10 of iron. It is

of a dull yellow, brownish, or red colour, has a greasy feel, and yields to the nail. It has a conchoidal fracture; its streak is shining, and it is opaque or slightly translucent. It is found in various localities, such as Armenia, Saxony, Tuscany, and the isle of Skye in Scotland. In ancient times, under the name of Lemnian bole or earth, it had a place in the materia-medica, but is no longer used. At present the only bole of commerce is a coarse pigment sold under the name of Berlin and English red.

BOLERO, the name given by the Spaniards to a number of their national dances of the ballet class, which in Spain are regularly performed in theatres between the different pieces. They are danced both by men and women, the male dancers who take part in these performances being also called *boleros*, while the females are called *boleras*. The dances of this class which are best known and most in vogue are known by such names as the *Cachuca*, *Iota aragonesa*, *Madrileña*, *Ole*, *Ialeo de Jerez*, &c. They are danced by one or more couples, or, as in the case of the indecent Ole, by a single female dancer. The dancers wear the Andalusian costume, partly because of all the national dresses of Spain this is the richest and most elegant, and partly because the greater number of the boleros are of Andalusian origin. The music for these dances is always played by the orchestra, and is generally marked by rapid changes of time. The melodies are often very beautiful, and are always based upon some of the national airs. The dancers mostly beat time to the music with the castanets (*castañuelas*). These dances, when the performers are well trained and handsome, have a very powerful effect on the spectators, consisting as they do of graceful attitudes and movements of the body, and being strictly speaking not dances, but pantomimes. The dancers endeavour to express by their gestures all the different phases of the passion of love, and this often in a manner which passes far beyond the bounds of modesty. The dances of the common people, on which the boleros are founded, are essentially distinguished from the latter by the fact that the former are accompanied by singing —partly that of the performers, partly that of the spectators—while the music is mostly supplied by the guitar, or in some cases by the tambourine. They are very simple, but at the same time very graceful. The dancers beat time with the castanets, as in the boleros properly so called.

BOLESLAS, the name of six kings of Poland and three of Bohemia. The most celebrated of them, Boleslas, surnamed the Great, and the first Polish sovereign who had the title of king, was son of Duke Mietchislaf, and succeeded him in 999. He completed the work of introducing Christianity which his father had begun, contributed greatly to the progress of civilization, and brought the army under regular discipline. The Emperor Otho III., who had begun to entertain some suspicions of him, resolved to ascertain his real character by visiting him in person, and was so much pleased with the deference with which he was received, that he crowned him with his own hands in 1001, and exempted him from all homage and tribute. Boleslas assumed all the splendour of his new dignity, and became a powerful sovereign. He not only repelled an agression on his territories by the Duke of Bohemia, but became in his turn the aggressor, and conquered Moravia. Success awakened a desire for new conquests, and the Russians, who hitherto had always been the aggressors, were attacked in their turn, and were obliged to purchase peace by the cession of large tracts of territory. He afterwards turned his arms to the N. of Germany, and compelled the greater part of the northern sovereigns to become his tributaries. In 1012 a formidable league was formed against him by the Emperor of Germany and the Dukes of Bohemia and Austria; but the allies, after sustaining serious reverses, were glad to conclude a peace with him in 1018. His last campaign was against the Russians, whom he signally defeated in a great battle on the banks of the Bug. After twenty years of continued warfare he was permitted to enjoy peace, and effected numerous internal improvements, promulgating excellent laws, and even putting a check upon his own power by the appointment of a council of twelve to act as mediators between the sovereign and the people. This body was the germ of the Polish senate. Boleslas died in 1025, after a reign of twenty-six years, which is one of the most glorious in the annals of Poland, and has handed down his name as one of the greatest sovereigns of his time.

BOLETUS, a genus of fungi of the order Hymenomycetes (fungi provided with a cap and a fructiferous membrane or hymenium which covers the sporules contained in the tubes). The greater number of the species are globulous, from which the Italians call them *ovoli*. The characters of the genus are, broad, hemispherical cap, the lower surface formed of open tubes, cylindrical in form, and adhering to one another. The tubes can be separated from the cap, and contain little cylindrical capsules, which are the organs of reproduction. They differ from the Polyporei by the absence of the membrane which incloses the tubes. *Boletus edulis* has the pedicle thick, especially at the base, and marked with red and pale white. The cap is also thick, smooth, and fawn-coloured. The tubes are very small, rounded, and pass from white to a greenish yellow. It grows on the ground abundantly in woods during summer. The flesh is firm, and has an agreeable nutty flavour. It is a considerable article of commerce in France, particularly in the neighbourhood of Bordeaux. It is also found in England, but more rarely. The other species of Boletus are numerous.

BOLEYN, ANNE, second wife of Henry VIII. of England, was the eldest daughter of Sir Thomas Boleyn, and Elizabeth Howard, daughter of the Duke of Norfolk. She was born, according to some accounts, in 1507, but according to more probable ones about the year 1501. She attended Mary, sister of Henry, on her marriage with Louis XII., to France, as lady of honour. On the return of that princess, after the king's death, she entered the service of Queen Claude, wife of Francis I., and after her death that of the Duchess of Alençon, sister of the French king. Young, beautiful, gay, and witty, she was an object of great attraction in the gallant court of Francis I. She returned to England about 1522, and became lady of honour to Queen Catharine, whom she soon supplanted. The king, passionately enamoured of her, found an unexpected opposition to his wishes, and Anne firmly declared that she could be had on no terms but those of marriage. She knew that the king already meditated a divorce from his wife, Catharine of Arragon; but she also knew what difficulties the Catholic religion opposed to the execution of this plan. Cranmer offered his services to bring about the accomplishment of the king's wishes, and thus gave the first occasion to the separation of England from the Roman Church. But the impetuous Henry did not wait for the ministers of his new religion to confirm his divorce: on the contrary, he married Anne in January, 1533, having previously created her Marchioness of Pembroke. When her pregnancy revealed the secret, Cranmer declared the first marriage void, and the second valid, and Anne was crowned queen at Westminster with unparalleled splendour. In 1533 she became the mother of the famous Elizabeth. She could not, however, retain

the affections of the king, as inconstant as he was tyrannical; and as she had supplanted her queen while lady of honour to Catharine, she was now supplanted herself by Jane Seymour, her own lady of honour. Suspicions of infidelity were alleged, which appear to have had no foundation in truth, but were doubtless eagerly laid hold of by Henry as a colour for his violent proceedings. In 1535 she was accused, and brought before a jury of peers. Smeaton, a musician, who was arrested with others, asserted that he had enjoyed the queen's favours, and May 17, 1536, she was condemned to death by twenty-six judges. Anne in vain affirmed that she had long before been contracted to the Duke of Northumberland, and therefore had never been the lawful wife of Henry. Cranmer in vain declared the marriage void. The sentence of death was executed by the command of the inflexible Henry, who esteemed it a great exercise of clemency to substitute the scaffold for the stake. The last day of the life of this unhappy woman, May 19, 1536, presents many interesting moments. She sent for the wife of the lieutenant of the Tower, threw herself upon her knees before her and said, 'Go to the Princess Mary (daughter of Catharine) in my name, and in this position beg her forgiveness for all the sufferings I have drawn upon her and her mother.' 'She sent her last message to the king,' says Hume, 'and acknowledged the obligations which she owed him in uniformly continuing his endeavours for her advancement.' 'From a private gentlewoman you have made me first a marchioness, then a queen, and as you can raise me no higher in this world, you are now sending me to be a saint in heaven.'

BOLINGBROKE, Henry St. John, Viscount, a distinguished statesman and political writer, was born in 1678 at Battersea, near London, of an ancient family, and died in 1751. He completed his studies at Oxford, where he early exhibited uncommon talents and attracted general attention. On entering the world he displayed a rare union of brilliant parts and elegance of manners, with beauty of person, dignity, and affability, and such fascinating eloquence that, according to the unanimous testimony of his contemporaries, nobody could resist him. Unfortunately the passions of his youth opposed the development of his talents; and in his twenty-third year he was distinguished principally as an accomplished libertine. His parents, supposing that marriage would have a salutary influence upon him, proposed to him the daughter of Sir Henry Winchcomb, a lady the heiress of a million, who united with a charming figure a cultivated mind and noble birth. But the young couple had lived but a short time together when irreconcilable disputes arose between them, in consequence of which they separated for ever. Another plan was adopted to give a better direction to the impetuous character of Bolingbroke. By the influence of his father he obtained a seat in the House of Commons. Here his eloquence, his acuteness, and the strength of his judgment attracted universal attention. His former idleness was changed at once into the most incessant activity. In 1704 he was made secretary of war, and came into immediate connection with the Duke of Marlborough, whose talents he discerned and whose enterprises he supported with all his influence. When, however, the Whigs gained the ascendency in 1708, Bolingbroke gave in his resignation. Now followed, as he said himself, the two most active years of his life, in which he devoted himself to study, but by no means neglected public affairs. He continued to maintain a constant intercourse with the queen, who preferred him to her other counsellors. The Whig ministry was overthrown to the astonishment of all Europe in 1710, and Bolingbroke received the department of foreign affairs. In 1712 he was called to the House of Lords by the title of Viscount Bolingbroke, and in 1713, against much popular opposition, he concluded the Peace of Utrecht, of which he was always proud. In concluding this peace everything was unfavourable to him—the Whigs, the peers, the bank, the East India Company, Marlborough, Eugene, the emperor, Holland, the jealousy of all the European powers, the weakness of his own queen, the irresolution, imprudence, and even the envy of his colleagues. Bolingbroke afterwards became a prey to the impetuosity of his passions, and exhibited a fickleness of conduct that has rendered his loyalty, his patriotism, and his whole character suspected. The collision of the Whigs and Tories produced such a general excitement that the ministers were attacked, the peace was decried as disastrous, and the Protestant succession was declared in danger. At this moment a fatal contention broke out between the lord-high-treasurer (the Earl of Oxford) and Bolingbroke, immediately after the conclusion of the peace. Swift, the friend of both, but particularly intimate with the lord-high-treasurer, accused Bolingbroke of having principally contributed to the ruin of their party. Be this as it may, Queen Anne, provoked to the utmost by Oxford, dismissed him four days before her death, and made Bolingbroke prime-minister. But the death of Anne changed the whole scene. George I. of Hanover ascended the throne, and the Whigs triumphed more completely than ever. Bolingbroke, who could not impose on the Hanoverian court by his plausible pretences, and who was as much envied as he was hated, was dismissed by King George while yet in Germany, and fled to France in March, 1715. In August of the same year he was attainted. James III., the *Pretender* as he was called, invited him to Lorraine, and made him his secretary of state. But when Louis XIV. died Bolingbroke lost all hope of the success of the Pretender, and repented of having entered into so close a connection with him. Whatever the feelings and plans of Bolingbroke may have been, his intentions with regard to James III. were doubtless honest. Nevertheless, the latter deprived him of his dignity and transferred it to the Duke of Ormond. Thus it was the strange fate of Bolingbroke to be charged with treachery both by the king and the Pretender. Offers were made to him by King George, on condition of his revealing the secrets of the Pretender. This proposal he at first declined, but he afterwards yielded so far as to promise a decisive blow against the cause of the Pretender on condition of the total oblivion of what had already passed, and of an entire confidence for the future. Walpole, however, was afraid of Bolingbroke's influence in Parliament, and opposed his recall. Bolingbroke, in order to forget his situation, applied himself to writing philosophical consolations after the manner of Seneca, but soon found sweeter ones in his marriage with a rich and amiable lady, niece of Madame de Maintenon. In 1723 the Parliament which had been so hostile to Bolingbroke was at length dissolved, and he was permitted to return to England. His estates, however, were not restored until two years after by a particular act of Parliament. On his return he lived at first retired in the country, maintaining, however, a correspondence with Swift and Pope. But no sooner was the voice of opposition heard in Parliament than he hastened to London, and, as the restoration of his seat in the House of Lords was still denied him, attacked the ministry during eight years in the journals or in pamphlets with great success. He drew upon himself powerful enemies, against whom he directed his Treatise on Parties, which is considered as his masterpiece. He then returned to France with the inten-

tion, as even Swift supposed, of throwing himself into the arms of the Pretender's party, against which charge Pope defended him, and declared that he had himself advised his noble friend to leave an ungrateful country, by which he was suspected and persecuted. In France Bolingbroke wrote (1735) his Letters upon History, which are admired even at the present day, but in which the individual character of the author appears to the exclusion of general views, and which were blamed, in particular, for attacking revealed religion, which he had once warmly defended. In 1729, in the midst of his contest with Walpole, he had suggested to Pope his Essay on Man, assisted him in the composition, and supplied him with the most important materials. His feelings finally carried him back to his country, where he wrote (1738) his Idea of a Patriot King under the eyes of the heir-apparent. He composed Considerations on the State of the Nation during the long and dreadful illness which resulted in his death in his seventy-fourth year. He bequeathed his manuscripts to David Mallet, who published them in five vols. in 1753; but scarcely had they appeared when a general cry was raised against them on account of their revolting attacks on Christianity. They were presented by the grand-jury of Westminster as subversive of religion, government, and morality. Bolingbroke was capable of inspiring the warmest friendship and the bitterest enmity. He was accused of immoderate ambition, and of a proud, passionate, envious, and implacable temper. His memoirs are useful as illustrating British history during the first quarter of the eighteenth century.

BOLIVAR, SIMON, the great military captain of South America, and the most prominent individual produced by the revolution in the Spanish colonies there, was born in the city of Caraccas, July 24, 1783, of a good family on both his father's and mother's side. He finished his education in Europe, where he spent some time in travelling. Having joined the patriotic party among his countrymen, and being one of the chief promoters of the movement in Caraccas of April 19, 1810, which is considered as the beginning of the revolution, he received a colonel's commission from the supreme junta then established. He took part in the first military operations of the Venezuelan patriots after the declaration of independence, July 5, 1811; but these proving unsuccessful, he retired to Curaçoa. Unable, however, to remain a cold spectator of the events occurring on the continent, he repaired to Carthagena in September, 1812, and, with other emigrants from Caraccas, entered into the service of the patriots of New Grenada. They gave him the command in the small town of Baranca, nominally under the orders of Labatut, the republican governor of Santa Marta; but Bolivar could not be content with the obscure part which must have fallen to him had he remained at Baranca. Instead of this he undertook an expedition against Teneriffe, a town higher up on the river Magdalena, occupied by the Spaniards, captured it, and, gathering forces on the way, he proceeded on his own responsibility to Mompox, driving the Spaniards before him from all their posts in the Upper Magdalena, and finally entering the city of Ocana in triumph amid the acclamations of the inhabitants. He soon conceived the bold project of invading Venezuela with his little army, and delivering it from the powerful forces under Monteverde. The Congress of New Grenada gratified him in this respect, and gave him a commission of brigadier; and after having overcome a multitude of difficulties which retarded his advance, and driven Correa from the valley of Cucutá, he commenced his march for Venezuela with a small force of but little more than 500 men.

Heedless of the accusations of rashness lavished on his enterprise, Bolivar plunged into the province of Merida; and, as the inhabitants rose upon the Spaniards on hearing of his approach, he was soon able to wrest the provinces of Merida and Trujillo from the Spaniards.

Meanwhile Bolivar obtained authentic intelligence of the horrid and shameless cruelties and oppressions everywhere perpetrated in Venezuela by Monteverde and his subordinate officers, analogous to the butcheries of Fiscar. Exasperated by the knowledge of these events, he issued the famous decree of *guerra á muerte*, condemning to death all the Spanish prisoners who might fall into his hands. But he was not of a cruel or sanguinary temper; and this decree seems to have been intended rather to intimidate the royalists than literally to be put in execution. His army increasing daily he separated it into two divisions, committing one of them to the charge of Rivas, and both rapidly advanced upon Caraccas, through the provinces of Trujillo and Varinas. Several engagements ensued in which the patriots were successful; and at length the decisive victory of Lastoguanes, in which the flower of Monteverde's troops were completely defeated, left open the road to Caraccas. Bolivar lost no time in marching upon the capital, which was evacuated by the Spaniards without a struggle, and entered in triumph by Bolivar, Aug. 4, 1813. Meantime, Marino had effected the liberation of the eastern provinces of Venezuela, of which the patriots had regained entire possession, excepting only the fortress of Puerto Cabello.

The success of the revolutionary party was not of long duration; Bolivar was beaten by the royalist General Boves, and Caraccas was retaken by the Spaniards in July, 1814, and before the end of the year the royalists were again undisputed masters of Venezuela. Once more, therefore, Bolivar now proceeded to Tunja, where the Congress of New Grenada was sitting. From this body he received the command of an expedition against the city of Bogotá, for the purpose of compelling the province of Cundinamarca to accede to the general union of the provinces of New Grenada, and thus put an end to the collision which divided the means and crippled the exertions of the Republicans. He marched against Santa Fé early in December, 1814, at the head of nearly 2000 troops, and having invested the city, and obtained possession of the suburbs by storm, was preparing to assault the great square, where the troops of Cundinamarca were posted, when the latter capitulated. The general government of New Grenada was now peaceably transferred to Bogotá. His next important service was an attempt to regain Santa Marta from the Royalists; but not being properly supported in it, and a large force under Morillo having arrived at the Isle of Margarita from Spain, Bolivar, aware that all further views upon Santa Marta were hopeless, threw up his command, and finding that he could not be usefully employed at Carthagena, embarked for Jamaica in May, 1815, to wait for better times.

From Kingston Bolivar repaired to Aux Cayes, in the island of Hayti, and having collected a small force he sailed to Venezuela, but was met by the Spaniards, and compelled to re-embark. Nothing disheartened by this failure he obtained reinforcements at Aux Cayes, and in Dec. 1816 landed once more in Margarita. There he issued a proclamation convoking the representatives of Venezuela in a general congress; and from thence passed over to Barcelona, where he organized a provisional government, and gathered forces to resist Morillo, who was approaching with a powerful division. They encountered each other on the 16th, 17th, and 18th

of February in a desperate conflict, which ended in Bolivar's obtaining the victory. Morillo retreated in disorder, and was met and defeated anew by General Paez with his irresistible *Llaneros*. Bolivar being now recognized as supreme chief, proceeded in his career of victory, and before the close of the year 1817 had fixed his head-quarters at Angostura. The sanguinary battles of this period, in the most important of which he was engaged in person, belong rather to the history of Colombia (which see) than to Bolivar's own life. He found time, however, to preside at the opening of the Congress of Angostura, Feb. 15th, 1819, and to submit a long and elaborate exposition of his views of government. He also surrendered his authority into the hands of the congress, which required him to resume it, and to retain it until the independence of his country should be fully achieved. Bolivar soon reorganized his forces, and set out from Angostura, with the purpose of crossing the Cordilleras, and effecting a junction with General Santander, who commanded the Republican forces in New Grenada, so that the united arms of the two republics might act with the greater efficiency. He succeeded in July, 1819, in reaching Tunja, which city he entered after a battle on the neighbouring heights, and on the 7th of August gained the great and splendid victory of Bojaca, which gave him immediate possession of Santa Fé and all new Grenada. The Viceroy Samano fled precipitately before him; and he was enthusiastically welcomed in Santa Fé as a deliverer, appointed President and Captain-general of the Republic, and enabled, by the new resources of men, money, and munitions of war which he found there, to prepare for returning into Venezuela with an army sufficient to insure the complete expulsion of the Spaniards.

Bolivar's entry into Angostura, after his glorious campaign in New Grenada, was a peculiarly gratifying and affecting spectacle. Its whole population hailed him as the liberator and father of his country. He embraced the favourable moment to obtain the fundamental law of Dec. 7th, 1819, by which the Republics of Venezuela and New Grenada were to be thenceforth united in a single state, under the presidency of Bolivar, and by the title of the *Republic of Colombia*. After a series of memorable advantages over the Spaniards, an armistice of six months was negotiated at Trujillo, between Bolivar and Morillo, and subscribed November 25th, 1820. Morillo soon afterwards returned to Spain, leaving La Torre in command. At the termination of the armistice, Bolivar made a great effort to finish the war by a decisive blow, and attained his object by vanquishing La Torre in the famous battle of Carabobo, which may be regarded as having put an end to the war in Venezuela. Bolivar entered Caraccas June 29th, 1820, having now for the third time rescued his native city from its oppressors, and was received with transports of joy. By the close of the year the Spaniards were driven from every part of the country, except Puerto Cabello and Quito; and the time was deemed auspicious for establishing permanent political institutions in Colombia. A congress assembled at Bogotá passed a constitution, which was adopted August 30th, 1821, and Bolivar was elected the first constitutional president, with General Santander for vice-president. Having thus achieved the independence of his own country, Bolivar placed himself at the head of the liberating army destined to expel the Spaniards from Quito and Peru. The fate of Quito was decided by the battle of Pichincha, fought in June, 1822, and gained by the talents and prowess of Sucre. Bolivar now marched upon Lima, which was evacuated by the enemy, and entering the capital amid the acclamations of the people, was invested with supreme power as dictator, and authorized to call into action all the resources of the country for its liberation. Internal dissensions, however, compelled him to return to Trujillo, leaving the capital to be retaken by the Spaniards, and it was not till the latter half of 1824 that he was enabled to take the field in sufficient force to dispossess them of the country. The victory of Junin gained by him, followed up by that of Ayacucho (which see) achieved by Sucre, reduced them to the Castles of Callao, where Rodil maintained himself till the beginning of 1826. In June, 1825, Bolivar visited Upper Peru, which detached itself from the government of Buenos Ayres, and was formed into a new republic, named *Bolivia*, in honour of the liberator, who was declared perpetual protector of the republic, and requested to prepare for it a constitution.

Having completed his project of a constitution for Bolivia, he presented it to the congress of that state, with an address dated May 25th, 1826. Among other features which alarmed the friends of liberty, the most exceptionable was a provision for lodging the executive authority in the hands of a president for life, without responsibility, and with power to nominate his successor. When the nature of the constitution became generally known in South America it excited the liveliest apprehensions, and Bolivar began to be accused of a design to unite permanently Colombia, Peru, and Bolivia, and to make himself perpetual dictator of the same. This indeed appears to have been the case, and he was very soon able to manage so that the Bolivian code was pronounced to be the constitution of Peru as well as Bolivia, and he himself the president for life. The constitution was promulgated officially, and was sworn to by the public functionaries in Lima, Dec. 9, 1826, the anniversary of the victory of Ayacucho. Meanwhile Bolivar was recalled to Colombia by the breaking out of a civil war between his adherents and the faction opposed to him.

At this time the Colombian auxiliary army in Peru was cantoned in three divisions; one stationed in Upper Peru and two in Lower Peru; one of these at Arequipa, and one in Lima. This third division consisted of veteran companions of Bolivar's triumphs, and was commanded by his personal friends, Generals Lara and Sands. Notwithstanding the attachment of these troops to Bolivar, they had lately been growing distrustful of his designs; and although they did not feel disposed, it would seem, to thwart his views upon Peru, they took fire immediately when they saw cause to believe that he had similar views upon their own native Colombia. The consequence was that in the short space of six weeks after the new constitution was solemnly adopted they came forward and revolutionized the government of Peru. So well were their measures taken that, Jan. 26, 1827, they arrested their general officers without any conflict or opposition; placed themselves under the command of Bustamante, one of their colonels; and announced to the inhabitants of Lima that their sole object was to relieve the Peruvians from oppression, and to return home to protect their own country against the alleged ambitious schemes of Bolivar. The Peruvians immediately abjured the Bolivian code, deposed Bolivar's council of ministers, and proceeded, in perfect freedom, to organize a provisional government for themselves. Arrangements were speedily made, after this bloodless revolution was effected, to transport the third division to Guayaquil, according to their own desire. They embarked at Callao March 17th, and landed in the southern department of Colombia in April, part of them proceeding for Guayaquil, and part for Cuença and

Quito, uniformly declaring their object to be the restoration of constitutional order in opposition to any designs upon the republic entertained by Bolivar.

Intelligence of these events reached Bolivar while he was still in the N. of Colombia. Rousing himself instantly from his long-continued inactivity, he made preparations for marching to the other extremity of the republic, and reducing the third division. But these troops, finding the government was in the hands of the regular national executive, had peaceably submitted to General Ovando, who was sent by the constitutional authorities for the purpose of taking the command. Bolivar meanwhile signified his consent to be qualified as president, and proceeded with this intent to Bogotá, where he arrived Sept. 10, took the oaths prescribed by the constitution, and resumed the functions belonging to his official station. To external appearance, therefore, Colombia was restored to tranquillity under the rule of her constitutional magistrates. But the nation was divided between two great parties, and agitated to its centre by their opposite views of the political condition of the country. Bolivar had regained the personal confidence of the soldiers and officers of the third division, who expressed the deepest repentance for their distrust of his character, and assured him of their entire devotion to his interests. But the Republican party and the friends of the constitution, with Santander at their head, continued to regard his ascendency over the army and his political movements with undisguised and not unfounded apprehension, universally accusing or suspecting him of a desire to emulate the career of Napoleon. They looked to the convention of Ocana, which was to assemble in March, 1828, for a decided expression of the will of the nation in favour of the existing republican forms. The military, on the other hand, did not conceal their conviction that a stronger and more permanent form of government was necessary for the public welfare; that the people were unprepared for purely republican institutions, and that Bolivar ought to be intrusted with discretionary power to administer the affairs of Colombia.

In 1828 Bolivar assumed the supreme power in Colombia, by a decree, dated Bogotá, Aug. 27, which gave him authority to maintain peace at home, and to defend the country against foreign invasions; to have the command of the land and sea forces; to negotiate with foreign powers; to make peace and declare war; to make treaties; to appoint the civil and military officers; to pass decrees and ordinances of every description; to regulate the administration of justice, &c. The decree provided, however, that he was to be assisted in the exercise of executive power by the council of ministers.

Bolivar continued to exercise the chief authority until May, 1830, when, dissatisfied with the aspect of internal affairs, he resigned the presidency, and expressed a determination to leave the country. Venezuela, under Paez, immediately declared herself independent of the central government; and the same spirit of disaffection was manifested by the other provinces. Bolivar, living in retirement at his country seat, refused to take any part in public events, until, after six months of confusion, he was pressed to resume the government by those who had succeeded him in the administration. He had finally yielded to this urgency, and consented to take the chief command, until the new elections should be completed, declaring it to be his firm resolution then to retire to private life, when he died at Carthagena on the 17th December, 1830. He met death with calmness and resignation, performing on the 11th the last act of his public life, by dictating and signing an address to the Colombian nation. From that time he continued delirious, with occasional lucid intervals, till the day of his death, expressing no other anxiety than for his country. 'Union! union!' was his most frequent exclamation. See Histoire de Bolivar, par Gen. Ducoudrey-Holstein, continuée jusqu'à sa Mort par Alphonse Viollet (Paris, 1831).

BOLIVIA, formerly called UPPER PERU, one of the independent republics of South America formed after the Spanish colonies in that continent had definitively won their freedom by the decisive battle of Ayacucho (Dec. 9, 1824), is bounded on the N. by Brazil, on the E. by Brazil and Paraguay, on the S. by La Plata and Chili, and on the W. by Peru and the Pacific. Until lately the boundaries with Chili and Brazil were not definitely fixed; but by the treaty of Aug. 10, 1866, the parallel of lat. 24° S. was settled as the boundary line with Chili, and an arrangement was made with Brazil also by a treaty dated March 27, 1867, which was ratified by both governments in the following year. With regard to the area included in these boundaries, the most diverse estimates have been made. The most usual estimates vary between about 500,000 and 600,000 square miles; but by a computation made in 1869 by Ondarza, it is placed so high as 842,730 square miles. It is equally impossible to give an exact statement of the population of Bolivia. Returns coming down to 1858 showed a population of about 1,800,000 exclusive of 245,000 Indians; but a new census was taken in 1869, and the population is now said to approach 3,000,000. Bolivia is divided into nine departments, viz. Chuquisaca, Potosi, Oruro, Tarija, Atacama, La Paz, Santa Cruz, Beni, and Cochabamba. The largest town is La Paz, but the executive government has, since 1869, had its seat at the fortified town of Oruro. The other important towns are Chuquisaca or Sucre, Potosi, and Cochabamba.

There is no country in the world, perhaps, possessing such a variety of soil and climate, of physical aspect and productions, as Bolivia. Nowhere else are to be seen such contrasts of nature, exhibited in close juxtaposition, on so grand a scale. The broadest part of the Andes, where these mountains, encompassing the great Lake of Titicaca and the Lake of Aullagas, 160 miles further S., divide into two chains, known as the East and West Cordilleras, lies within the limits of this state in its western portion. This double range of lofty mountains presents to the W. nothing but an abrupt and uniform ridge, while the eastern branch throws off numerous ramifications which extend a long way from the Cordillera, forming numerous valleys which run nearly from E. to W., and pour their waters, some into the Pilcomayo, an affluent of the La Plata, and hundreds of others into the Mamoré, Beni, and other great affluents of the Amazon. These streams are likely to be, in course of time, of immense importance to Bolivia in developing her commerce towards the Atlantic. Beyond these spurs of the Eastern Cordillera Bolivia presents a new aspect. The hills cease, and are succeeded by a plain exceeding Great Britain in superficial extent, in which no stone, nor even a pebble, is to be found, and which is annually flooded to such a degree by the numerous fine rivers which run through it, that communications by boat are practicable across it in nearly all directions. This is the country of the Moxos. Beyond this, towards the Paraguay, the plain rises, in general, above the reach of inundation, and rocks and hills of moderate height again make their appearance. This is the country of the Chiquitos.

The climate of Bolivia is as various as its physical aspect and conformation. On the more elevated parts

in the N.W. there is frost every night, but the sky is always bright and cloudless, and the air dry; while the lower parts of the country are, on the other hand, moister and hotter. The inhabitants distinguish three regions of climate, the Puna, Paramo, and Yungas. The first is elevated and cold, the region of the llama and alpaca. The country round Lake Titicaca comes, for the most part, under this denomination. The second or middle region is temperate and productive, and being now inhabited by European settlers, is filled with European grains and fruits. The third region, that of the valleys, has a decidedly hot climate, and is distinguished by a rank vegetation. With all this difference of climate, Bolivia is nevertheless unsurpassed in point of general salubrity. It has but rarely been visited by epidemics, and cholera and yellow fever, the two great scourges of the other South American states, are here unknown.

The natural wealth and resources of Bolivia are immense. It has long been famed for its mineral wealth, for the Peru of the old Spaniards which was so famous for the treasures drawn from it was no other than the present Bolivia, Upper Peru. The celebrated Potosi was once the richest silver district in the world, and yielded, between 1556 and 1834, £163,000,000. Its average annual yield at present is £450,000, although many of its veins are now exhausted. Besides that, Bolivia is capable of producing every product which is known to South America. The vine, formerly forbidden by the Spaniards, is now introduced. The warm and well-watered valleys supply corn and fruit. In the Tungas the chief objects of culture are, among others, coffee (said to be excellent), cocoa, tobacco, maize, and sugar-cane. At the same time the mountains and hill-sides are covered with animals such as the sheep, llama, alpaca, &c. The Bolivians have been prevented from taking anything like full advantage of their vast natural wealth, by having on the W. side only a small line of coast (about 100 miles), and that, too, shut off from the interior by a range of mountains difficult to be crossed, and by having the Amazon, the natural outlet for their commerce on the E., closed against them by the government of Brazil. In 1867, however, the latter obstacle was removed. The Empire of Brazil in that year opened the Amazon River to Peru and Bolivia, and thus 3000 miles of navigable Bolivian rivers (half of them navigable for steamers drawing 6 feet) have been put in connection with the main river. The only remaining obstacle to this connection, the cataracts and rapids on the Madeira, will be obviated by a railway avoiding them, which the Brazilian government has determined to construct.

Two-thirds of the population belong to the aboriginal races of the country, and the remainder are Mestizoes, or descendants of the original settlers by native women. The indigenous inhabitants of the Bolivian highlands, near Lake Titicaca, are the Aymaras; while to the N. and E. dwell the Quichua, with whom the former were united under the dominion of the Incas. (See PERU.) They speak distinct though cognate languages, and they do not differ much from one another in character and disposition. They are industrious, gentle, and intelligent, and they have great powers of endurance.

Bolivian history commences with the year 1825, when the republic was founded. The constitution was drawn up for the new state by General Bolivar, in whose honour the name of the state was changed to Bolivia, and was adopted by Congress in 1826. It established a legislative body composed of three chambers, with a president elected for five years. It has since suffered different modifications, in 1826, 1831, and 1863. The chief of these modifications consists in the reduction of the chambers of the legislative assembly to two, both elected by universal suffrage. But since 1839 Bolivia has been almost continually distracted by a series of internal and external troubles; and can scarcely be said to have had any definite constitution.

BOLKHOFF, or BALKHOV, a town, Russia, capital of a district of the same name in the government and 34 miles N. of town of Orel, on the Nougra. It is a very ancient place, is chiefly built of wood, and contains twenty-two churches, a monastery, and a nunnery. It has manufactures of leather, and of worsted stockings, and a considerable trade in hemp, hemp-oil, and tallow. Pop. 10,000.

BOLL (from the Saxon *bolla*, a boll), an old Scotch measure for corn, varying in different districts and for different articles. A boll of wheat or beans was equal to 4 bushels, a boll of oats to 6 bushels. The boll is still used in some parts of Scotland, but is no longer legally recognized.

BOLLANDISTS, a society of Jesuits which has published, under the title Acta Sanctorum, the well-known collection of the traditions of the saints of the Roman Catholic Church. They received this name from John Bolland (died 1665), who edited the first five volumes from materials already accumulated by Heribert Rosweyd, a Flemish Jesuit, whose collections were intrusted to Bolland at his death in 1629. The society was first established at Antwerp. On the abolition of the society of Jesuits in 1773, it was removed to the monastery of Candenberg, in Brussels. The abolition of the monasteries by Joseph II. brought about its dissolution. A new association was formed in 1837 under the patronage of the Belgian government.

BOLOGNA (anciently *Bononia*), one of the oldest, largest, and richest cities of Italy, capital of the province of the same name. It lies at the foot of the Apennines, between the rivers Reno and Savena, 190 miles N.N.W. Rome. Bologna is 5 or 6 miles in circumference, and is surrounded by an unfortified wall of brick. It is an archbishopric, and has a tribunal of appeal in the first instance, and of commerce. It has extensive manufactures of silk goods, velvet, artificial flowers, &c. The town consists of four quarters, the older poorly, and the modern handsomely built. There are colonnades along the sides of the streets affording shade and shelter to the foot-passengers. Bologna was long renowned for its university, founded, according to tradition, by Theodosius the younger in 425, and restored by Charlemagne, which, in the centuries of barbarism, spread the light of knowledge over all Europe. It once had 10,000 students, but the number now averages only 300. Here the famous Irnerius taught the civil law in the eleventh century; and men like Bulgerus, Martinus, Jacobus, and Hugo attracted pupils from every quarter. Several learned ladies have also at different times been professors here, such as Laura Bassi, professor of mathematics and natural philosophy, and Matilda Tambroni, professor of Greek, and the predecessor of the famous Cardinal Mezzofanti. The university formerly possessed so much influence, that even the coins of the city bore its motto—*Bononia docet*. The law school enjoyed the greatest fame. Its teachers had the reputation of inculcating principles favourable to despotism, and were consequently rewarded by the favour of the emperors, and of the Italian sovereigns. During 1400 years every new discovery in science and the arts found patrons here. The medical school is celebrated for having introduced the dissection of human bodies, and the scientific journals prove that the love of investigation is still awake in

Bologna. The university, indeed, still enjoys a considerable reputation. A citizen of Bologna, General Count Fern. Marsigli, founded in 1709 the Instituto delle Scienze, and gave it a library which numbers about 105,000 volumes, with 6000 manuscripts. The Church of San Domenico has a library of 90,000 volumes. Count Marsigli founded and endowed also an observatory, an anatomical hall, a botanical garden, and accumulated valuable collections for all branches of science and art. These collections are lodged in the university buildings, formerly the Palazzo Cellesi. In the sixteenth century the famous painters and sculptors Caracci, Guido Reni, Domenichino, and Albano founded a school, to which their works have given great reputation. (See PAINTING.) There were, even as early as the twelfth and thirteenth centuries, great painters in Bologna. Francesco, called *il Francia*, was famous in the fifteenth century.

The chief square of the city, Piazza Maggiore, the forum in the middle ages, is adorned by several venerable buildings: among them are the Palazzo Pubblico, which contains some magnificent halls, adorned with statues and paintings; Palazzo del Podestà, chiefly remarkable as having been the prison of Enzius, king of Sardinia, and son of the emperor Frederick II., who was captured and kept here by the Bolognese for more than twenty years, till his death; and the church or basilica of St. Petronio, with its unfinished front and the meridian of Cassini drawn upon a copper plate in the floor. Among the hundred other churches, the following are distinguished: S. Pietro, S. Salvatore, S. Domenico, S. Giovanni in Monte, S. Giacomo Maggiore, all possessed of rich treasures of art. The palaces are numerous, and were formerly enriched with numerous and valuable works of art. Many of these have now disappeared, though frescoes and other internal decorations still remain. The collection of the Academy of Painting, endowed in modern times by the municipality, principally with the treasures of abolished churches and monasteries, is rich and full of historical interest. The admired fountain of the market is adorned with a Neptune in bronze, by John of Bologna. The leaning towers Degli Asinelli and Garisenda, dating from the twelfth century, are among the most remarkable objects in Bologna. The former is square and of massive brickwork, built in three portions, and diminishing in diameter to the top. Its height is 321 feet, and its inclination from the perpendicular 6 feet 10½ inches. The Garisenda is 161 feet high, and inclines a little more than 8 feet. Bologna has always been famous for cheap living, and has been chosen as a residence by many literary men. Gourmands praise it as the native country of excellent maccaroni, sausages, liquors, and preserved fruits. The pilgrimage to the Madonna di S. Lucca, whose church is situated at the foot of the Apennines, ½ league distant from Bologna, and to which an arcade of 640 arches leads, annually attracts a great number of people from all parts of Italy.

Bologna was founded by the Etruscans under the name of *Felsina*, before the foundation of Rome. In 189 B.C. it was made a Roman colony, and called *Bononia*. On the fall of the Roman Empire, it was taken by the Longobards, then it passed into the hands of the Franks, and was made a free city by Charlemagne. In the twelfth and thirteenth centuries it was one of the most flourishing of the Italian republics; but the feuds between the different parties of the nobles disturbed the stable government of the city, and led to its submission to the papal see in 1513. Several attempts were made to throw off the papal yoke, one of which, in 1831, was for a time successful. In 1849 the Austrians obtained possession of Bologna, and made it the head-quarters of their 2d Italian Corps. In 1860 Bologna was by popular vote annexed to the dominions of King Victor Emmanuel. Pop. in 1872, 115,957.

BOLOGNA PHIAL, a small flask of unannealed glass, which flies into pieces when its surface is scratched by a hard body. It is prepared by the glass-maker as a test of the condition of a pot of metal before he fashions it into bottles or glasses.

BOLOGNA STONE. See BARYTA.

BOLSEC, JEROME HERMÉS, born at Paris in the beginning of the sixteenth century, died at Lyons, 1585, was appointed almoner to the Duchess of Ferrara; but having embraced the doctrines of the Reformation, he became a medical practitioner. After remaining for some time at Ferrara he repaired to Geneva, and insinuated himself into the good graces of Calvin. A quarrel afterwards took place, occasioned, it is said, by the opposition of Bolsec to the doctrine of absolute election. It issued in his imprisonment and ultimate banishment from Geneva. He returned to France after a short retirement at Berne, and after formally abjuring Protestantism at Autun, settled as a physician in Lyons. His talents were not of a high order, but he acquired considerable notoriety by the violence of his philippics against Calvin and Beza, in which, under the name of their Lives, he has raked together and published all sorts of scandal, without the least regard either to truth or decency.

BOLSENA (ancient *Vulsinii*, one of the twelve Etruscan cities), a town and lake in the kingdom of Italy, situated 50 miles N.N.W. of Rome. The *town* stands on the N. side of the lake of the same name. It is surrounded by a high wall flanked with towers, and defended by a ditch, and is rich in remains of antiquity. Pop. 2100.—The lake (ancient *Lacus Vulsiniensis*), supposed to have been a crater, is about 9 miles long, and about 7 miles broad, 285 feet deep at the deepest part, 1000 feet above the level of the sea, and well stocked with fish. It is surrounded by wooded hills, affords some charming scenery, but its shores are unhealthy. It contains the two islands of Bisentina and Martana, which were anciently believed to be floating; and gives rise to the river Marta, which flows to the Mediterranean.

BOLSWARD, a town of Holland, in the province of Friesland, 15 miles S.W. of Leeuwarden, at the junction of several canals. It is bordered N.E. by rich corn and pasture lands, and on the W. and S. has several lakes that teem with fish. It is circular, surrounded by a high earthen rampart, now a public walk planted with trees, and is everywhere intersected with deep canals, crossed by numerous stone and wooden bridges. The streets are wide and airy, the houses and gardens remarkably neat and clean. The parish church is said to be the largest and finest in Friesland. The trade of Bolsward consists chiefly in cattle, cheese, and butter; above 500,000 lbs. of cheese, and nearly as much butter, are yearly brought to market. Many of the inhabitants make their living by spinning what, under the name of Friesland worsted, is sent largely to other provinces. There are also two woollen and one linen manufactory, shipbuilding yards, tile and brick works, potteries, and tanworks. Pop. 4747.

BOLTON, or BOLTON-LE-MOORS, a large manufacturing town, and municipal and parliamentary borough, of Lancashire, England. It lies 10 miles N.W. from Manchester, and consists mainly of two divisions, Great Bolton and Little Bolton, separated from each other by the river Irwell. The town is of ancient date, being raised to the dignity of a market town by Henry III. in 1256. The older portion of the two contains many narrow and irregu-

lar streets, but by far the larger portion of it is modern. The streets are now for the most part well paved and drained. Among the public buildings are one of the finest market-halls in England, opened in 1855, and costing with its approaches nearly £100,000; a church institute for educational purposes; three temperance halls; commodious baths, with public rooms for concerts and exhibitions; a fine savings-bank; a theatre; a mechanics' institution, a noble building in the Romanesque style; a new post-office, new gas offices, county court, &c. A fine town-hall, in the Grecian style, with a tower 220 feet high, fronts the spacious market-square, and was erected at a cost of upwards of £100,000. The religious edifices are numerous, and some of them of fine architectural appearance. Foremost among these is St. Peter's Parish Church, a new building in the decorated style, embracing a nave with N. and S. aisles and transepts, a chancel with an aisle on the S. and an organ chapel on the N., and a tower at the western end 150 feet high. The other churches most worthy of notice are Holy Trinity Church, a fine specimen of the early English style; St. Paul's, Deansgate, in the early geometric style, consecrated in 1865; St. James', opened in 1869, style early decorated Gothic; St. Mark's, Lever Street; and St. Stephen and All Martyrs', a most elegant and ornamental building of terra-cotta. The borough contains numerous chapels for Roman Catholics, Methodists, Baptists, Presbyterians, Friends, Unitarians, &c. The schools are numerous and well attended, and some of the school buildings are of considerable architectural pretension. There is a free grammar-school, founded in 1641, with thirty-six foundation scholars and two university exhibitions of £60 a year each. The Bolton Free Public Library, opened in 1853, contains about 25,000 vols., and is a great boon to the town. During the present century the town has greatly increased, and attained to a high degree of commercial prosperity. In 1337 emigrant Flemings introduced the manufacture of woollen cloth into Bolton, and laid the foundation of its future importance. So early as the reign of Henry VIII. the town and its vicinity were celebrated for producing what Leland calls cottons; which, however, were woollens, the vegetable cotton not having been introduced until the reign of James I. Many of the improvements in the cotton manufacture originated in Bolton, and to these it mainly owes its present flourishing condition. In 1869 Bolton had eighty cotton-mills, using annually about 8000 tons raw cotton, and employing 13,925 persons. The articles chiefly woven are, plain and fancy muslins, superfine printing calicoes, quiltings, and counterpanes; dimities, jeans, cotton shawls, and the generality of power-loom productions. Bleaching is also carried on to a great extent, there being twenty-three bleaching grounds, some of them very large. Besides these there are collieries, paper-mills, foundries, chemical works, and various other branches of industry. Bolton returns two members to Parliament. Pop. of the mun. bor. in 1871, 82,854; of parl. bor. 92,655.

BOLT-ROPE, a rope used to strengthen the borders of the sail of a ship. Those on the sides are called *leech ropes*, the others *head* and *foot ropes*.

BOLTS, NAVAL, are cylindrical rods of iron or copper employed for binding together the plates or timbers of a ship. They vary in diameter from ½ inch to 3 inches, and in length from a few inches to many feet.

BOMARSUND. See ALAND.

BOMB, a large, hollow iron ball or shell, formerly often made of cannon-metal, and sometimes of an oval form, with a hole in which a wooden fuse is cemented, and with two little handles. Bombs are thrown from mortars. They are filled with powder and combustible matter (which consists of equal parts of sulphur and nitre, mixed with some mealed powder), and are used for setting fire to houses, blowing up magazines, &c. The charge in bombs of 74 lbs. contains from 5 to 8 lbs. of powder, and 1 lb. of the other composition above mentioned. In bombs of 10 lbs. it amounts to 1 lb. of powder and from 2 to 3 oz. of the mixture. The fuse, which is hollow, and filled with powder and other inflammable ingredients, sets fire to the charge. The length and the composition of the fuse must be calculated in such a way that the bomb shall burst the moment it arrives at the destined place. Instead of the proper bomb-shell, conical shells shot from rifled cannon are now frequently used. The use of rifled cannon permits of the shells being discharged at a greater range, and at the same time secures greater precision, while the conical shell, such as the *segment shell*, invented by Sir William Armstrong, is more effective than the ordinary bomb-shell.

As early as the seventh century, balls filled with burning matter were thrown from vessels of clay, then from machines called *blydes* or *manges*, or with hand-slings made of a small net of iron wire. In 1328 James I., king of Arragon, used at the siege of Valencia a kind of large rockets made of four parchment skins, which burst in falling. Afterwards, large iron balls, heated red hot, came into use. In the middle of the fifteenth century Prince Rimini Sigismund Pandulf Malatesta invented mortars and bombs. They consisted, at first, of two hollow hemispheres of metal, filled with powder, and held together by chains. By degrees they received their present shape. An English engineer, Malthus, whom Louis XIII. took into his service, introduced them into France, and used them first (1634) at the siege of Lamotte, in Lorraine.

The *grenades*, which are thrown from howitzers, are easily distinguished from the bombs, which are cast from mortars. The first are used only in the field, the latter in sieges. So-called bomb-proof walls are made 3½ feet thick; but the strongest walls would offer no protection against the immense shells (36–39 inches) which have recently been constructed.

BOMBARDIER BEETLE, the name given to a number of coleopterous insects belonging to the genera Brachinus and Aptinus, and to the family Carabidæ. They derive their name from the remarkable power they possess of being able to expel from the anus, with a pretty loud report, a pungent, acrid fluid, which evaporates immediately on being discharged, and serves as a means of defence against their enemies. Five or six species of the genus are found in Britain, the most common of which is the *B. crepitans*. It is rather less than ½ inch long, has greenish or blue-black wing-cases; head, thorax, and legs yellowish red; and is frequently found under stones. The Aptini differ from the Brachini chiefly in not having wings.

BOMBAST, in composition an attempt by strained description to raise a low or familiar subject beyond its rank, which, instead of being sublime, becomes ridiculous. Its original signification was a stuff of soft, loose texture used to swell out garments.

BOMBAX. See SILK-COTTON TREE.

BOMBAY, a presidency, island, and city in British India. The presidency, lying between lat. 14° and 29° N., and lon. 66° and 77° E., is irregular in its surface, presenting mountainous tracts, low, barren hills, valleys, and high table-lands. The principal rivers, the Nerbudda and Taptee, fall into the Gulf of Cambay. The valleys are exceedingly fertile, and large extents of land in the Surat and other districts, formerly waste and barren, have been turned to account

in the cultivation of cotton. The former want of means of transit has been supplied by the formation of roads and railroads, facilitating the conveyance of the productions (especially cotton) of the country to the port of Bombay. The climate varies; so that while Bombay and its vicinity are very unhealthy, other places, such as Poonah, are very favourable to Europeans. The chief productions of the soil are cotton, rice, dates, and cocoa-palms; sugar and indigo are raised in Candeish. The area of the presidency is 205,665 square miles, which includes 81,852 belonging to Bombay proper, 52,493 to Sindh, and 71,320 to native states. The pop. of Bombay presidency, including Sindh, is 14,000,000, and with the native states above 20,000,000. In 1856 the imports were £11,577,304; exports £10,291,916; in 1870–71 the imports had risen to £14,677,838, and the exports to £25,800,893, all including treasure. The growth of cotton in Bombay received a great impetus during the American war, so that the quantity of raw cotton exported to Great Britain in 1863 amounted to 3,004,196 cwts., and in 1867 to 3,326,538 cwts. Latterly, however, it has somewhat declined. The quantity exported in 1870–71 was 2,851,846 cwts., valued at £8,736,628.—The city and seaport are situated on a narrow point of land at the S.E. extremity of the island of the same name, and are connected with the mainland and the interior by extensions of the Bombay and Baroda, and the Great Indian and Peninsula Railways, the former being carried to the island of Colabah, the S.W. point of the harbour. The town is divided into two portions, one lying next to the sea and surrounded with fortifications; the other, called the Black, or Native Town, is situated about 1 mile N.W. The streets in the former are narrow, and the houses high, with projecting verandahs. The bazaars in the lower part of the town are narrow and dirty, and chiefly kept by Parsees, an industrious and intelligent race of Persian descent. The European population live partly within the fort, but mostly in villas or bungalows with verandahs, and surrounded with extensive areas, called compounds, in various parts of the island. Bombay Castle, the government offices, and almost all the merchants' warehouses and offices are within the fort. There are several churches in Bombay, which is also the see of an Anglican bishop. The Black Town is on a low site, and used to suffer from inundations; but much has been done to remedy this, though the place is still very unhealthy. In 1859 a university was opened, and several schools and colleges in other places affiliated to it. The commercial activity of the port has greatly increased, owing very much to the export of cotton. By far the greater portion of the exports and imports of the presidency pass through Bombay. The harbour is one of the largest and safest in India; while its scenery and that of the neighbouring continent presents a rare combination of grandeur and beauty. It is 12 or 14 miles long, and from 4 to 6 wide. It is situated between the islands of Colabah, Bombay, and Salsette on the one hand, and the mainland and islands of Caranjah and Elephanta on the other, and is defended by formidable batteries. There are large and commodious docks, the ships and basins being calculated for vessels of any size. Ship-building used to be extensively carried on, frigates and even ships of the line having been built here. Bombay is the chief Indian port connected with the establishment of steam navigation between India and this country. In 1837 three steam-vessels sailed between Bombay and Suez; there is now a regular transmission of the mails by steam every week. There is also regular steam communication with China, Australia, Singapore, Mauritius, &c. A railway between Bombay and Tannah, on the island of Salsette, 20 miles distant, opened in 1853, was the first Indian railway constructed. Pop. in 1871, 646,636.—The island of Bombay is about 8 miles long from N. to S., and about 3 miles broad, formed by two ranges of rock running parallel to each other on opposite sides of the island. The interior was formerly liable to be overflowed by the sea, to prevent which substantial walls and embankments were constructed, but the lower parts are still covered with water during the rainy monsoon. On the S.W. and S.E. it terminates in two peninsular projections inclosing a bay between them.

Bombay was obtained by the Portuguese in 1530 from an Indian chief at Salsette; by them it was ceded to Great Britain in 1661, and in 1668 it was transferred by the king to the East India Company. Next to Madras it is the oldest of our possessions in the East. From the commencement of the last century it has gradually increased in importance, and has now attained a high degree of prosperity.

BOMBAZINE, derived from *bombyx*, the Greek term for silk and silkworm, is a mixed tissue of silk and worsted, and was long woven both plain and coloured. The latter, however, has gone into disuse, and the only colour now used is black, for which there is an extensive demand, both at home, where it is the female mourning dress, and abroad, especially in Spain and South America, where some of the religious orders use it, and it generally forms the material of the almost universally-worn *mantilla*. The manufacture was originally introduced into England by a colony of Dutch or Flemings, who settled in Norfolk, and long continued to have its principal seat at Norwich, the capital of that county, though it is now chiefly confined to Halifax and Kidderminster.

BOMB-KETCH, a name applied to a kind of vessel which was formerly built for the use of mortars at sea, and furnished with all the apparatus necessary for a vigorous bombardment. Bomb-ketches were built remarkably strong, to sustain the violent shock produced by the discharge of the mortars. They generally carried two 10-inch mortars, four 68-pounders, and six 18-pound carronades. A bomb-ketch was generally from 60 to 70 feet long from stem to stern, drew 8 or 9 feet of water, carried two masts, and was usually of 100 to 150 tons burden. It was generally attended by a brig as tender, on board of which the party of artillery remained till their services were required on board the bomb-vessels.

BONA (the *Aphrodisium* of Ptolemy), a seaport of Algeria, prov. of and 86 miles N.N.E. Constantine; lon. 7° 36′ E.; lat. 36° 32′ N. Pop. about 18,000. It is built at the foot of a hill, and is surrounded by a wall nearly 2 miles in circumference. It is the seat of French judicial courts. The streets are narrow and crooked, but many of the houses are substantial and well built, and the town has been greatly improved since it came into the hands of the French in 1832. It possesses a college, schools, a fine Catholic church, a convent of the Sisters of Mercy, an hospital, &c. There is a good market, and also reading-rooms, coffee-houses, and a theatre. The chief manufactures are burnooses, tapestry, and saddles. It exports corn, wool, hides, wax, oil, honey, and coral; and its trade is considerable. There is regular steamboat communication between Bona and Marseilles. About 1 mile S. of the town are the remains of Hippo Regius.

BONA DEA, a name given by the Latins to Fauna or Fatua. She was so chaste that no man saw her after her marriage but her husband, for which reason her festivals were celebrated by night

in private houses, and all statues of men were veiled during the ceremony. By the Greeks the Bona Dea was identified with Hecate, Semele, or other divinities.

BONA FIDES, Bona Fide, a term derived from the Roman jurists, and frequently occurring in connection with Scottish legal matters, but scarcely holding a place in English law. It means of course 'good faith,' or 'with good faith,' and implies the absence of all fraud or unfair dealing, being therefore opposed to *mala fides* or *dolus* (bad faith or deceit). In the law of Scotland a *bona fide* possessor is a person who holds property upon a title which he honestly believes to be good. When such a person has been evicted by one who can prove a better title, he is entitled to retain what profits he has derived from the property during his period of possession. *Bona fides* ends when the possessor becomes aware of the insufficiency of his title, but this is naturally a point which there is generally considerable difficulty in fixing. The term '*bona fide* traveller' frequently crops up in Scotland in cases coming under the Forbes Mackenzie Act.

BONAPARTE, or Buonaparte, the name of a Corsican family—a name now as well known as any in history. Several families are mentioned as early as the twelfth century who bore the name of Bonaparte, and who took a position of some prominence in the history of Italy. In 1122, for instance, a Bonaparte was banished from Florence as a Ghibelline. Corrado Bonaparte is mentioned in 1170 and Jacopo Bonaparte in 1210 as knights of the order of the Golden Spur. The office of *podestà* was held by Nordio Bonaparte in Parma in 1272, by Pietro Bonaparte in Padua 1285, and by Giovanni Bonaparte in Florence 1333. In 1250 a Bonaparte was syndic of Ascoli, and in 1440 Cesare Bonaparte was chosen as head of naval affairs at Sarzana. A Giovanni Bonaparte is said to have married a niece of Pope Nicholas V. in 1404, but this seems doubtful for chronological reasons. It is however certain that about 1454 Niccolo Bonaparte was ambassador of this pope to several courts, and vicar of the Holy See in Ascoli. Another Niccolo Bonaparte, professor at San Miniato in the sixteenth century, is stated to have been the author of the comedy La Vedova (Florence, 1568); and a work on the Sack of Rome in 1527 is attributed to the Tuscan Giacomo or Jacopo Bonaparte, who was an eye-witness of the event. The connection between these different Bonapartes is by no means well established; yet in 1771 the relationship of the Corsican Bonapartes with the Florentine Bonapartes was judicially recognized. In Corsica itself a Messire Bonaparte appears as witness to an act executed by Berengar II. of Italy as early as 947, and it is therefore not improbable that the family originally emigrated from this island to the mainland, and that a branch of the Genoese line returned to their old home in the sixteenth century. From the time of Gabriel Bonaparte, who settled at Ajaccio in 1567, and took part in the naval expeditions against the Moors, the Bonapartes ranked as a patrician family of that town. In 1576 Girolamo Bonaparte was elected deputy of Ajaccio in the senate of Genoa, and in 1614 Francesco was chosen captain of his native town. About the middle of the eighteenth century there remained three male representatives of the family of Bonaparte at Ajaccio, viz. the archdeacon Luciano Bonaparte, his brother Napoleone, and the nephew of both, Carlo, son of Giuseppe. Carlo, or Charles Bonaparte, born 29th March, 1746, was destined by fate to be the father of the Emperor Napoleon I. and of a numerous family of princes. He was carefully educated, studied law at Pisa, and soon after his return married without the consent of his relatives Letizia Ramolino, a beautiful patrician. He fought under Paoli for the independence of Corsica, but resistance to the French proving useless he went over to their side. In 1771, when Louis XV. caused 400 Corsican families to be selected who alone were to be considered noble, the Bonaparte family—and consequently Charles—was among the number. By the influence of the French governor Marbœuf, who was very friendly towards the family, he was (1773) named royal councillor and assessor for the town and province of Ajaccio. As a member of the deputation of Corsican nobles sent to the court of France in 1777 he resided several years at Paris, and was fortunate enough to secure a free admission for his eldest son Joseph to the seminary at Autun, another for his second son Napoleon to the military school of Brienne, and a third for his daughter Maria Anna to the educational institution at St. Cyr. He returned to Corsica in 1779, and afterwards went to Montpellier, where he died, 24th Feb. 1785. By his marriage with Letizia Ramolino he left eight children: Giuseppe, or Joseph (see below), king of Spain; Napoleon I., emperor of the French (see Napoleon I.); Lucien (see below), prince of Canino; Maria Anna, afterwards called Elise, princess of Lucca and Piombino, and wife of Prince Bacciocchi (see Bacciocchi); Luigi, or Louis (see below), king of Holland; Carlotta, afterwards named Marie Pauline, princess Borghese (see Borghese); Annunciata, afterwards called Caroline, wife of Murat (see Murat), king of Naples; and Girolamo, or Jerome (see below), king of Westphalia. See also Bonaparte (Letizia Ramolino).

BONAPARTE, Jerome, youngest brother of Napoleon, was born at Ajaccio in Corsica on 15th November, 1784, and at an early age entered the French navy as a midshipman. In 1801 he was sent out on an expedition to the West Indies, but the vessel being chased by English cruisers, was obliged to put in to New York. During his sojourn in America, Jerome Bonaparte became acquainted with Miss Elizabeth Patterson, the daughter of the president of the Bank of Baltimore, and a descendant, as is asserted, of 'Old Mortality,' immortalized by Sir Walter Scott. His addresses to this young lady having been accepted, they were duly married on 24th December, 1803, according to the Roman Catholic ritual, in the cathedral of Baltimore, and in 1805 embarked for Europe. This marriage of his brother did not meet the approval of the Emperor Napoleon, whose ambitious views it thwarted, and he accordingly, after an ineffectual application to Pope Pius VII. to have it dissolved, issued a decree declaring it to be null and void. On 12th August, 1807, Jerome was married to Catherine Sophia, princess of Würtemberg, and in a few months afterwards was created King of Westphalia, and crowned with great pomp at Cassel on 1st January, 1808. His government was not marked by much judiciousness or prudence; little regard was paid to national feelings, and the finances of the state, both from mismanagement and the frequency of hostile incursions, became ere long involved in hopeless embarrassment. The battle of Leipzig put an end to Jerome's reign, and he was obliged to take flight to Paris. On the conclusion of the treaty of Paris he left France, and proceeded first to Switzerland, thence to Grätz, and in the beginning of 1815 to Trieste. On his brother's return from Elba he again proceeded to Paris, and was nominated a peer of France. At the battles of Ligny and Waterloo he was actively engaged, and displayed considerable bravery, besides receiving a wound in the arm. On Napoleon's overthrow he retired first to Switzerland, then to Würtemberg, and from this period up to the fall of Louis

Philippe in 1848, resided in different parts of Europe under the title of the Comte de Montfort, and latterly chiefly in Florence. On the outbreak of the revolution of February in the year last mentioned, he returned to Paris, and was appointed on 23d December governor-general of the hospital of the Invalids, and in 1850 a marshal of France. In 1852 he was made president of the senate. He died after a lingering illness at his seat of Villegenis, near Paris, on 24th June, 1860.

Reference has already been made to the two successive marriages contracted by Jerome Bonaparte. From his union with Miss Patterson only one son proceeded, Jerome, who was brought up among his maternal relations in America, and married a lady of that country, by whom he had a son, who served as an officer in the French army during the Crimean war. Of Jerome Bonaparte's second marriage with the Princess of Würtemberg two children remain, Prince Napoleon Joseph and the Princess Mathilde. A process before the civil tribunals of France in reference to these marriages excited considerable interest. The unaltered stability of the first marriage had all along been maintained by Madame Bonaparte (Miss Patterson), and on the death of Jerome, her son, M. Jerome Napoleon Bonaparte, lodged a claim to a share with the offspring of the second marriage in the property left by his father, founding on the title of his legitimacy. After a trial, in which the ablest forensic eloquence in France was displayed on behalf of both parties, judgment was given against him, though the validity of his mother's marriage by the laws of Great Britain and America, and indeed on the broad principles of general law and equity, can scarcely admit of a doubt.

BONAPARTE, Joseph, the eldest brother of Napoleon, was born at Corsica in 1768, educated in France at the college of Autun, returned to Corsica in 1785, on his father's death, studied law, and in 1792 became a member of the new administration of Corsica under Paoli. In 1793, after Paoli had called in English aid, he emigrated to Marseilles, and became brother-in-law to Bernadotte, afterwards king of Sweden, by marrying one of the daughters of a wealthy banker named Clari. In 1796 he accompanied the army of Italy as commissary, in 1797 was elected a Corsican deputy to the Council of Five Hundred, and shortly after was sent by the Directory ambassador to the pope. He returned abruptly, and had not long resumed his seat in the Council of Five Hundred, when his brother having become first consul he was made councillor of state, and employed to negotiate a treaty with the United States. Shortly after, in 1801, he negotiated the peace of Luneville with the Emperor of Germany, and in 1802 that of Amiens with Great Britain. Napoleon having now begun to deal out kingdoms among his family, Joseph was made King of Naples and Sicily in 1806, but had only reigned two years when his brother recalled him, and sent him to Madrid to be King of Spain and the Indies. His seat at Naples had not been comfortable, and he now found himself on a bed of thorns. His kingship lasted nominally for five years, but he was chased once and again from his capital, and the third time, in 1813, fled not to return. In these appointments Joseph was merely a tool in his brother's hands. In 1814, after the fatal expedition to Russia, Napoleon on setting out for the army made him lieutenant-general of the empire, and head of the council of regency. This was his last office of any consequence. After the battle of Waterloo he sailed for the United States, purchased an estate on the banks of the Delaware near Philadelphia, and there fixed his residence, assuming the title of Count de Survilliers, and living in considerable style. On the revolution of 1830 he addressed a letter to the chambers putting in a claim for Napoleon's son. Shortly after he came to England, and after residing for some time repaired to Italy, and died at Florence in 1844, leaving property which has been estimated at more than £500,000.

BONAPARTE, Letizia Ramolino, the mother of Napoleon, and hence known by the name of *Madame Mère*, was born at Ajaccio in Corsica in 1750, and was married in 1767 to Charles Bonaparte, a lawyer and small proprietor, who fought under Paoli for the independence of his native island against the French. She was left a widow in 1785, and continued to reside in Corsica till her son became first consul, when she fixed her residence at Paris, had a separate establishment assigned to her, and lived in considerable state, though somewhat retired. All things considered, she conducted herself with great discretion, performing her part becomingly in the station to which she had been so unexpectedly elevated, and yet never allowing herself to forget that in the necessary course of events the sudden rise of her family might one day be terminated by an equally sudden fall. When the fall came she retired to Rome, and collecting most of the surviving members of her family around her, lived to the very advanced age of eighty-six, dying in 1836.

BONAPARTE, Louis, Count of St. Leu, second younger brother of the Emperor Napoleon I., and father of Napoleon III., the late Emperor of the French, was born in Corsica, 2d September, 1778. He was educated in the artillery school at Chalons, accompanied Napoleon to Italy, and afterwards to Egypt, but without distinguishing himself in any special manner. He subsequently rose to the rank of a brigadier-general, and in 1802 married Hortense Eugenie Beauharnais, Napoleon's step-daughter. In 1806, on Schimmelpenninck, grand pensionary of Holland, demitting his office, Louis Bonaparte was compelled by his brother, notwithstanding his protestations, to accept the Dutch crown. The difficult situation in which he was placed rendered it impossible for him to be anything else than a mere viceroy of Napoleon; but to his credit it must be recorded that he exerted himself to the utmost in promoting the welfare of his new subjects, and resisted as far as in him lay the tyrannical interference and arbitrary procedure of France. With all his efforts, however, he found himself unable to restore the finances of the country to a healthy condition: a quarrel took place between him and his brother relative to the continental system maintained by the latter, which had proved most injurious to Dutch commerce, and he ultimately, on 1st June, 1810, abdicated the sovereignty, and retired to Grätz under the title of the Count of St. Leu. Holland was thereupon annexed to France. In 1814 Louis paid a visit to Paris, and strongly counselled his brother to make peace with the allies. After the restoration he took up his abode at Rome, and separated himself from his wife Hortense, a disunion which continued throughout his life. In 1826 he removed from Rome to Florence, and from thence, a short time after his son's escape from the fortress of Ham, to Leghorn, where he died on 25th July, 1846. His literary abilities were considerable, and he was the author of a novel entitled Marie, les Peines de l'Amour ou les Hollandaises, and Documents historiques et Réflexions sur le Gouvernement de la Hollande, par Louis Bonaparte, ex-roi de Hollande; besides other works.

BONAPARTE, Lucien, Prince of Canino, next younger brother of Napoleon, born at Ajaccio in 1775, emigrated to Marseilles in 1793, and made himself conspicuous as a hot-headed republican by speechifying at clubs, and publishing bombastic pam-

phlets. Shortly after, having been appointed to a situation in the commissariat at the small town of St. Maximin in Provence, he married the innkeeper's daughter. He made a narrow escape during the Reign of Terror, and in 1796 was appointed commissary at war, and next, on his election as a member of the Council of Five Hundred, took up his residence in Paris. He joined the opposition in the council, and seconded Sièyes and his party, who wished to frame a new constitution. He is said to have written to his brother in Egypt complaining of the incapacity of the executive Directory, and urging his return; and in 1799, when the council wished to outlaw Napoleon, Lucien, who was president, after manfully resisting the motion, slipped quietly out of the chair in the confusion, and sent in the soldiers, who cleared the hall. The revolution thus mainly accomplished by his decisive procedure led to the establishment of the consular government, and Lucien was member of the commission which framed its constitution. He was now appointed minister of the interior, but had only held it for a short time when he lost it by quarrelling with his brother, and was sent ambassador to Spain. Here the kind of work given him to do appears to have suited him, and he succeeded by ingratiating himself with Charles IV. and Godoy in re-establishing French ascendency, and preparing the way for the series of intrigues in which the character of Napoleon appears in its most unfavourable light. On his return to Paris in 1802 he was member of the tribunate, and then a senator, and having lost his first wife, scarcely improved upon his former matrimonial contract by marrying a stockbroker's widow. This marriage, and probably other concurring causes, appear to have given deep offence to Napoleon, and in the enactment fixing the succession to the crown, while Joseph and Louis were named eventual heirs, Lucien and Jerome were not mentioned. Lucien now fixed his residence at Rome, where he appears to have gained the good graces of Pius VII., who created him in 1808 Prince of Canino. During Napoleon's subsequent treatment of the pope, Lucien had freely expressed his displeasure, and apparently despairing of a reconciliation with his brother, or perhaps not caring to ask it, he embarked for the United States in 1810, but had not proceeded far when he was captured by a British cruiser and carried to Malta. Ultimately he was brought to England, and allowed to reside on parole at a place in the vicinity of Ludlow Castle. Here he employed much of his time in writing a poem entitled Charlemagne, which he afterwards published with a dedication to Pius VII. After the battle of Waterloo his brother appointed him his extraordinary commissioner to the chamber of deputies. He showed no lack of zeal in endeavouring to arouse a feeling of sympathy, but found the attempt vain, and left matters to take their course. He afterwards returned to Italy, and died there in 1840. Besides the poem Charlemagne, which has been translated into English, and published in two vols. 4to, he wrote another, called La Cyrneide ou la Corse Sauvée, and an autobiography, which, under the title of Mémoires, was published in London in 1836, and of course during his lifetime. His eldest son, CHARLES LUCIEN JULES LAURENT BONAPARTE, Prince of Canino and Musignano, was born at Paris in 1803, and achieved a considerable reputation as a naturalist, chiefly on the subject of ornithology. He published a continuation of Wilson's Ornithology of America, the Iconografia della Fauna Italica, the Conspectus Generum Avium, and a number of other valuable works on zoology, and was a member of the leading natural history societies in Europe and America. He died on 29th July, 1857.

BONAVENTURE, St., properly John of Fidanza, one of the most renowned scholastic philosophers, was born in 1221 in Tuscany, became in 1243 (or 1248) a Franciscan monk; in 1253 teacher of theology at Paris, where he had studied; in 1256 general of his order, which he ruled with a prudent mixture of gentleness and firmness. He died in 1274 at the age of fifty-three. At this time he was a cardinal and papal legate at the Council of Lyons. His death was hastened by his ascetic severities. On account of his blameless conduct from his earliest youth, and of some miracles ascribed to him, he enjoyed during his life the greatest veneration, and was canonized by Pope Sixtus IV. The elevation of thought in his writings procured him the name *Doctor Seraphicus*. The Franciscans oppose him as their hero to the Dominican scholastic Thomas Aquinas. He wrote for the honour and improvement of his order, for the promotion of the worship of the Virgin, on celibacy, transubstantiation, and other doctrines. He is frequently obscure by his attempts to support the creed of the church with arguments drawn from the Aristotelian and new Platonic philosophy, and by his mystical views in treating of the moral and intellectual perfection of the human character. Yet he is distinguished from other scholastics by perspicuity, avoidance of useless subtleties, and greater warmth of religious feeling. Among his writings are Itinerarium Mentis in Deum; Reductio Artium in Theologiam; Centiloquium; and Breviloquium. His whole works were published 1588–96, at Rome, eight vols. folio. But many pieces in that collection are not genuine.

BOND, a deed or instrument of obligation in writing, whereby one person (or more) becomes bound to another or others to pay a sum of money, to abide by an award, or to do some lawful act, or not to do some particular thing or things specified in the condition of the bond. The person who gives the bond and so binds himself to do something is called the obligor, the person receiving the bond is called the obligee. If there is no stipulation in the bond that the obligor shall suffer any penalty in case of non-performance, the bond is called a simple one. But there is generally a condition added that if the obligor does some particular act, the obligation shall be void, or else shall remain in full force, as payment of rent, performance of covenants in a deed, or repayment of a principal sum of money borrowed of the obligee, with interest; which principal sum is usually one-half of the penal sum specified in the bond. In case this condition is not performed the bond becomes forfeited or absolute at law, and charges the obligor while living, and after his death his personal representatives and his heirs, if the heirs be named in the bond. In case of a failure to perform the condition of the bond, the obligee can recover only his principal, interest, and expenses; if the bond were given to secure the payment of money, or if it were given to secure the performance of a covenant, he can recover only reasonable damages for the breach. A bond stipulating either to do something which is *malum in se* or *malum prohibitum* (that is, either wrong in itself, or forbidden by law whether wrong in itself or not), or to omit the doing of something which is a duty, or to encourage such crimes and omissions, is void. Bonds to procure marriage (or marriage brocage bonds), or to restrain marriage, or for immoral considerations, such as future (but not past) cohabitation, and also in total but not partial restraint of trade, are void (Wharton). No person who cannot legally enter into a contract can become an obligor, though such a person may become an obligee. A married woman, or an infant, or a lunatic, therefore, though they cannot grant a bond, may have bonds granted them, by which the obligor must abide. No

particular form of words is essential to the validity of a bond; but it must be stamped and sealed. In Scotland bonds differ somewhat in form from those drawn up in England, and they do not require to be sealed.

BONDAGE. See VILLENAGE.

BONDI, CLEMENT, one of the most popular poets of modern Italy, was born in 1742 at Mizzano, in the duchy of Parma, became Jesuit shortly before the suppression of the order, and was appointed professor of eloquence in the University of Parma. He afterwards provoked the hostility of the order by publishing an ode in praise of their suppression, and was obliged to seek an asylum in the Tyrol, where the Archduke Ferdinand took him under his protection, appointed him his librarian at Brünn, and intrusted him with the education of his sons, one of whom afterwards succeeded to the duchy of Modena. In 1816 Bondi was appointed professor of history and literature at Vienna, and died there in 1821. He was an easy and elegant versifier, and cultivated with success almost all the varieties of poetry—lyric, didactic, satirical, and elegiac. Among the most important are La Giornata Villereccia, La Conversazione, and La Felicità. He also executed a metrical version of the Æneid, which some consider his best work.

BONDOU, a country of Africa, Senegambia, situated in lat. 14° N., and lon. 12° 30′ W., and supposed to be about 97 miles long by 80 miles broad. It is very imperfectly known, but is understood to have a very luxuriant vegetation, and to be not only covered with magnificent forests, but to be in many parts under good culture, producing large crops of cotton, millet, maize, indigo, tobacco, &c. Its principal stream is the Falemé, which swarms with crocodiles. The sovereign is a hereditary despot, and nineteen-twentieths are either actually slaves, or in a condition scarcely differing from slavery. Pop. roughly estimated at 1,500,000.

BONE. The bones are the hardest and most solid parts of animals; they constitute the frame, serve as points of attachment to the muscles, and afford support to the softer solids. They are the instruments, as muscles are the organs, of motion. In the mammalia, birds, fish, and reptiles, the whole system of bones united by the vertebral column is called the *skeleton*. In the fœtus they are first a vascular gelatinous substance, in different points of which earthy matter is gradually deposited. This process is perceptible towards the end of the second month, and, at the time of maturity, the bone is completely formed. After birth the bones become gradually more solid, and, in the temperate zones, reach their perfection in men between the ages of fifteen and twenty. From this age till fifty they change but slightly; after that period they grow thinner, lighter, and more brittle. Those of the two first classes of animals are harder on their exterior than they are internally. Their material is nearly the same throughout. Their structure is vascular, and they are traversed by the blood-vessels and the absorbents. They are hardest at the surface, which is formed by a firm membrane called the *periosteum;* the internal parts are cellular, containing a substance called *marrow*. The use of the marrow is to prevent the too great dryness and brittleness of the bones.

Chemistry decomposes bone into gelatin, fat, cartilage, and earthy salts. A fresh bone boiled in water, or exposed to the action of an acid, gives out its gelatin; if boiled in water, on cooling the decoction a jelly is formed which makes a good portable soup. A pound of bone yields twice as much as the same quantity of flesh. The earth of bones is obtained by calcination; that is, by exposing them to a red heat, by which they are deprived of the soft substances. It consists principally of calcic phosphate, with small quantities of magnesic phosphate, and of calcic carbonate and fluoride. Bones are now very extensively used as fertilizing agents. See BONE MANURE.

BONE BLACK, IVORY BLACK, or ANIMAL CHARCOAL, the black carbonaceous substance into which bones are converted by calcination or destructive distillation in close vessels, and which is extensively used in the process of sugar-refining. This application of it is due to the property which it possesses in common with other kinds of charcoal, but in a superior degree, of depriving various kinds of solutions, syrups, &c., of their colouring matters, and thus blanching or purifying them. Animal charcoal is prepared either by heating the bones in a retort similar to that in which the coal is decomposed in gas-works, or, which is the better plan, in small cast-iron pots piled up in a kiln. The pots are placed above each other with their mouths in contact, the mouths being luted together with loam. Two of the pots together hold about 50 lbs. of bones, which should previously be freed of all fatty, fleshy, and tendinous matters, as the quality of the charcoal is in this case improved. The bones lose, on the average, about half their weight in the process of calcination. The charcoal is ground between grooved rollers in order to prevent the formation of dust, and by this means it is reduced to the condition of coarse grains varying from the size of turnip-seed to that of peas. Liquids are decolourized by passing them through a filter or bed of thin granular charcoal, which absorbs by mechanical action the colouring matters held in solution. The filtering beds used in sugar-refining are sometimes of the depth of 50 feet. After the liquor has flowed for a certain time the charcoal becomes completely saturated, and its purifying action ceases. It has then to be restored so that it may be used again, and this is effected by various means, such as washing with water or with weak hydrochloric acid, long exposure to air and moisture, or heating to redness. The last is the best method, and is the one almost invariably adopted, the charcoal being heated in iron pipes, fire-clay chambers, or in rotating cylinders.

BONE MANURE. The introduction of bones as a field manure is one of the most important agricultural improvements that have been effected in modern times, and more particularly as having been the means by which turnip culture has been carried over extensive tracts of country which were previously almost valueless and unproductive. Their value as fertilizing agents arises from the fact that they furnish on decomposition large quantities of ammonia, carbonic acid, phosphorus, lime, &c., all of which are so necessary to the support and growth of plants. Both the organic and the earthy matter of which the bones consist are equally valuable. The phosphates of the earthy portion of the bones are dissolved by the action of rain-water (which always contains carbonic acid), and thus find their way into plants. The action of the air at the same time aids in the decay of the organic matter, and as a consequence of this transformation, carbonic acid and ammonia are simultaneously with the phosphates presented to the plants. A very small quantity of this rich manure, if wholly used by the plants, ought to be sufficient for the wants of a large crop—54 lbs., for instance, would supply phosphates for an acre of wheat or oats—but the mechanical structure of bones opposes their rapid decay and solution, and extends their action over a long period. The fatty substance in bones prevents the access of air and water, both of which are necessary to render them available for

plants. When they are boiled this fat and a certain quantity of gelatin (the nitrogenous ingredient of bone) are removed. This process, by removing the ammonia-producing ingredients, rather deteriorates the value of the bones than otherwise; but by altering their mechanical structure, and rendering them more liable to be acted on by the weather, boiled bones become speedily useful, and are often preferred. The method of reducing bones by breaking them to small pieces, or grinding them to dust, depends for its advantage on the same circumstance. The surface of the bone exposed to the action of the weather is much increased by these operations, and the decay and solution of the manure more rapidly effected. When the soil contains much organic matter, burned bones (or bone-ash) are often applied with advantage. Burned bones absorb water and air very readily, and by the combined action of these the lime phosphate is quickly dissolved; but it ought not to be forgotten that neither phosphates nor nitrogenous substances are by themselves useful, but only so when in combination, and therefore that burned bones can only be applied with advantage when other sources for the organic elements of plants are fully supplied at the same time. The fermentation, or, as it is more correctly called, the putrefaction of bones, is also intended to make them more speedily available as manure, and it has this advantage, that while both the mineral and organic matter are rendered more soluble, very little of the latter is wholly lost. An excellent species of bone manure is that known as dissolved bones, the bones being dissolved in hydrochloric or, what is much better, sulphuric acid. The earthy constituents of bones are thus rendered soluble in water, and a most important adjunct to the action of the phosphoric acid and ammonia is given in the sulphuric acid, as sulphur is an essential ingredient of the flesh-forming principles of plants.

Bones were first prepared by machinery in Yorkshire and Lincolnshire in 1814 or 1815, but the machinery was then very imperfect, and only broke the bone into pieces from the size of an egg to that of a walnut. Successive improvements have made the form or size of the pieces almost completely at the power of the crusher where the machinery is sufficiently powerful, and the manure can now be obtained in a finely divided condition, when it forms bone-dust, or in a coarser state, the fragments varying from ½ to ¾ inch in size. The fine dust holds the highest mercantile value. The extensive use of bones upon the turnip soils of England, and the high estimation they have also attained as a dressing for pasture in Cheshire and other grazing counties, and for remote uplands, has caused an extensive importation of foreign bones into this country. The quantity imported for manure in 1871 (including fish-bones) was 92,878 tons, valued at £596,266. Russia, Egypt, Uruguay, and the Argentine Confederation sent the largest share. The bones collected in our own country are generally most highly esteemed, and fetch the highest price in the market. Before being turned to the purposes of agriculture they are very often boiled for the sake of the oil or fat they contain, which is used in the manufacture of soap, and in the composition of lubricants for the axles of carts, waggons, &c.

BONER, Ulrich, the most ancient German fabulist, was a Dominican friar at Bern, in the first half of the fourteenth century. He lived when the age of minstrelsy and chivalrous poetry was in its decline, and published a collection of fables under the title Der Edelstein (The Gem), which is distinguished by purity of language and picturesque simplicity of description. The first editions of these fables were by Bodmer and Eschenburg. Benecke published a very good edition with explanatory notes and an excellent vocabulary (Berlin, 1816).

BONESET, or Thoroughwort (*Eupatorium perfoliatum*), is a very useful annual plant, indigenous to America. It is easily distinguished in the autumn in marshy grounds by its tall stem, 4 or 5 feet in height, passing through the middle of a large double hairy leaf, which is perforated by the stalk and surmounted by a broad flat head of light purple flowers. It is much used as a medicine throughout the country, in the form of an infusion of the heads of the flowers and part of the remainder of the plant in boiling water, which is allowed to stand a few minutes upon the fire. It is one of the best domestic articles for breaking up and throwing off a violent cold, for which purpose from ½ pint to 1 pint of the above infusion may be drunk cold at bed-time, which will be found to purge by morning, or it may be taken warm before eating in the morning, when it will generally operate as an emetic and purgative. Smaller quantities of the infusion, taken warm through the day, in bed, and in combination with other medicines, will be found highly serviceable in rheumatism and rheumatic fevers. The cold infusion has tonic properties, and is often used instead of Peruvian bark.

BONHILL, a town and parish in Dumbartonshire, Scotland. The town is beautifully situated on the E. bank of the river Leven, which is here crossed by a handsome suspension bridge connecting Bonhill with Alexandria, about 3 miles N. of Dumbarton. The houses are generally well built; the inhabitants are chiefly employed at the numerous printfields in the neighbourhood. Within the parish stands a monument to the memory of Dr. Smollett, who was born on the banks of the Leven. The pop. of the town in 1871 was 2510.

BONIFACCIO (Latin, *Bonifacium*), a seaport, Corsica, on the strait of same name, which separates Corsica from Sardinia, 45 miles S.S.E. from Ajaccio. It stands on a peninsula about 180 feet above the sea, is well built, and contains several handsome churches. The port is good, but difficult of access on account of its narrow entrance. Wine and oil are exported, and a coral fishery is carried on. Pop. 3594. The Strait of Bonifaccio is 7 miles broad, and contains several small islands.

BONIFACE, the name of several popes.—Boniface I., elected 418 by a party of the clergy, and confirmed by the Emperor Honorius, who declared the anti-pope Eulalius a usurper. Boniface persecuted the Pelagians, and extended his authority by prudent measures. A decree of the Emperor Theodosius deprived him, in 421, of the spiritual sovereignty over Eastern Illyria. He died 422. His history proves the Roman bishop to have been, in his time, dependent on the secular power.—Boniface II., elected 530; died in 532. The death of his rival, the anti-pope Dioscorus, a few days after his election, left him in quiet possession of the papal chair. He acknowledged the supremacy of the secular sovereign in a council held at Rome.—Boniface III., chosen 607, died nine months after his election.—Boniface IV., elected 608. He consecrated the Pantheon (which see) to the Virgin and all the saints.—Boniface V., a Neapolitan, was pope from 619 to 625. He confirmed the inviolability of the asylums, and endeavoured to diffuse Christianity among the English.—Boniface VI., a Roman, elected 896, died of the gout a fortnight after.—Boniface VII., anti-pope, elected 974 during the lifetime of Benedict VI., whose death he was suspected of having caused. Expelled from Rome he returned on the death of Benedict VII., and found the chair occupied by John XIV., whom he deposed and threw into prison,

where he allowed him to die of hunger. Boniface died eleven months after his return.—BONIFACE VIII. See the article.—BONIFACE IX., Pietro Tomacelli of Naples, succeeded Urban VI. at Rome during the schism in the church, while Clement VII. resided at Avignon. He was distinguished for the beauty of his person and the elegance of his manners, rather than for a profound knowledge of theology and canon law. Even the counsel of his experienced cardinals could not save him from the commission of gross blunders. He was more skilled in the arts of simony and extortion. He sold the same benefice repeatedly, made the annates a regular tax in 1392, and lavished the treasures thus procured on his relations or in costly edifices—the fortification of the castle of St. Angelo, for instance, and the Capitol. He supported the pretensions of Ladislaus to the throne of Naples, and during the greatest part of his pontificate was engaged in negotiations at Avignon with his rivals, Clement VII. and Benedict XIII. He died in 1404.

BONIFACE VIII., BENEDICT CAJETAN, born at Anagni of an ancient Catalonian family; elected pope Dec. 24, 1294. He received a careful education, studied jurisprudence, was a canon at Paris and Lyons, advocate of the consistory, and prothonotary of the pope at Rome. After Martin IV. had elevated him to the dignity of a cardinal (1281) he went as legate to Sicily and Portugal, and was intrusted with embassies at several courts; in particular with the charge of reconciling the King of Sicily with Alphonso of Arragon, and Philip the Fair with Edward I. of England. After Cœlestine V. had resigned the papal dignity at Naples, in 1294, at the instigation of Boniface, the latter was chosen pope. He met with opposition from the cardinals of the family Colonna, and revenged himself by excommunicating them. His induction was magnificent. The Kings of Hungary and Sicily held his bridle on his way to the Lateran, and served him at table with their crowns on their heads. Boniface, however, was not successful in his first efforts for the increase of his power. The sovereignty of Sicily was denied him, and Frederick II. was crowned king there in spite of his excommunication. He was equally unsuccessful in his attempt to arbitrate between England and France. The bulls which he issued at this time against King Philip the Fair of France obtained no consideration. This was also the case with the interdict which he pronounced against him at the Council of Rome in 1302. Supported by the states and the clergy of France, Philip defended his royal rights against the encroachments of the pope. The pope was accused of duplicity, of simony, of usurpation, of heresy, of unchastity; and it was resolved to condemn and depose him at a general council at Lyons. Philip went still further: he sent Nogaret to Italy in order to seize his person and bring him to Lyons. Nogaret united himself for this purpose with Sciarra Colonna, who with his whole family had been oppressed by Boniface, and was in consequence his enemy. Boniface fled to Anagni, where Nogaret and Colonna surprised him. Boniface on this occasion acted with spirit. 'Since I am betrayed,' said he, 'as Jesus Christ was betrayed, I will die at least as a pope.' He assumed the pontifical robes and the tiara, took the keys and the cross in his hand, and seated himself in the papal chair. But the insignia of his holy office did not save him from arrest. Nay, Colonna went so far as to use personal violence. Boniface remained in a disagreeable confinement for two days, when the Anagnese took up arms and delivered him. After this he departed to Rome, where he died, a month later, in 1303. From fear of poison he had not taken any food during his captivity. This abstinence brought on a fever which terminated fatally. Boldness in his views, and perseverance in his resolutions cannot be denied to Boniface; but these qualities were stained by ambition, vanity, a spirit of revenge, and a mean pliability. Dante assigns to him, as guilty of simony, a place in hell between Nicholas III. and Clement V. Boniface founded, in 1300, the centennial jubilee, and enriched his treasury by the frequent sale of indulgences. He was an accomplished man for the times in which he lived.

BONIFACE, ST., the apostle of Germany, who first preached Christianity and spread civilization among the Germans. He was born in England (680), and his original name was Winfrid. In his thirtieth year he was consecrated a priest. A great part of Europe at this period was inhabited by heathens, and several missionaries set out from England and Ireland to convert them. Among these was Boniface, who in 716 conceived the plan of preaching Christianity among the Frieslanders, but was prevented by the war between Charles Martel and the King of Friesland, Radbod. He therefore returned to England, where he was chosen abbot. In 718 he went to Rome, where Gregory II. authorized him to preach the gospel to the nations of Germany. He commenced his labours in Thuringia and Bavaria, passed three years in Friesland, and journeyed through Hesse in Saxony, baptizing everywhere, and converting the Pagan temples to Christian churches. In 723 he was invited to Rome, made a bishop by Gregory II., and recommended to Charles Martel and all princes and bishops. His name Winfrid he changed to Boniface. In 724 he destroyed the oak sacred to Thor, near Geismar, in Hesse, founded churches and monasteries, invited from England priests, monks, and nuns, and sent them to Saxony, Friesland, and Bavaria. In 732 Gregory III. made him archbishop and primate of all Germany, and authorized him to establish bishoprics, the only existing bishopric being the one at Passau. He founded those of Freisingen, Ratisbon, Erfurt, Barabourg (transferred afterwards to Paderborn), Würtzburg, and Eichstädt. In 739 he restored the episcopal see of St. Rupert, at Salzburg. After the death of Charles Martel he consecrated Pepin the Short king of the Franks, in Soissons, by whom he was made Bishop of Mentz. He held eight ecclesiastical councils in Germany, founded the famous abbey of Fulda, and undertook in 754 new journeys for the conversion of the infidels. He was killed at Dockum, in West Friesland, by some barbarians in 755, in his seventy-fifth year. In Fulda a copy of the Gospels, in his own handwriting, is to be seen. At the place where Boniface built, in 724, the first Christian church in North Germany, near the village of Altenburg, in the Thuringian forest, a monument has been erected to his memory. The most complete collection of the letters of Boniface was published at Mentz, 1789, folio; and of his entire works, two vols., Oxford, 1845.

BONIN, or ARZOBISPO ISLANDS, several groups of islands, North Pacific Ocean, extending from lat. 27° 44′ 30″ to 26′ 30′ N. The N.W. island of the most northern cluster, called Parry Group, is in lat. 27° 43′ 30″ N.; lon. 142° 8′ E.; the cluster consists of small isles, pointed rocks, and very irregular bottom. The largest of the chain is Peel Island, on the W. side of which is a good harbour called Port Lloyd, in lat. 27° 5′ 30″ N.; lon. 142° 11′ 30″ E., nearly surrounded by hills crowned with palm-trees. Almost every valley has a stream of water. Green turtle abound in the sandy bays. Sharks are numerous, and fish of several kinds plentiful. Peel Island is inhabited by some English, Americans, and Sandwich Islanders, who cultivate maize, vegetables, tobacco, and the sugar-cane. It is frequently visited by vessels in want of water and fresh provisions.

BONINGTON, RICHARD PARKES, was born in October, 1801, at Arnold, a village near Nottingham, where his father was a portrait-painter. On attaining the age of fifteen the family removed to Paris, where, having early displayed a decided predilection for art, he entered as a student at the Royal Institute of France, and was also for a time in the studio of Baron Gros. His genius displayed itself in landscape-painting, and he rapidly rose to great eminence in this department, first in Paris and afterwards in England, to whose Royal Academy Exhibition he contributed several pictures which created a great sensation. A brilliant career was in prospect for him, when he was cut off by pulmonary consumption. This took place at London, to which he had removed for the benefit of medical advice, on 23d September, 1828.

BONITO, a name applied to several fishes of different genera belonging to the mackerel family (Scomberidæ). One of these, the bonito of the tropics (*Thynnus pelamys*), is well known to voyagers from its persistent pursuit of the flying-fish. It is a graceful and beautiful fish, of about 2½ feet in length, steel blue on the back and sides, silvery on the belly, with four brown longitudinal bands on each side. It feeds chiefly on small fish and the higher mollusca, and is good eating, though rather dry. In the Mediterranean the *Auxis vulgaris*, a fish about 15 inches in length, blue along the back, less elegantly shaped than the mackerel, but with a similar tail, is called the bonito, or plain bonito. Both these fishes have been caught in British waters.

BONN, a city of the Prussian province of the Rhine, capital of a government of the same name, formerly the residence of the Elector of Cologne, on the left bank of the Rhine. Pop. 26,020. It is pleasantly situated, walled, and surrounded by gardens, but has narrow irregular streets. It has, however, a large and finely planted square, part of which is occupied by an ancient Gothic cathedral. The town-hall is perhaps the handsomest of its modern edifices, but all other buildings and institutions are eclipsed by the celebrity of the university, the charter of which was given Oct. 18, 1818, at Aix-la-Chapelle, by the King of Prussia, who at the same time endowed it with an annual income of 80,000 Prussian dollars (£12,000), 16,000 of which are appropriated to the botanical garden. The former residence of the Elector of Cologne was bestowed on the university. It has been fitted up at great expense, and is surpassed in extent and beauty by no university building in Europe. It contains all the lecture-halls, a library of more than 200,000 volumes, a museum of antiquities, a collection of casts of the principal ancient statues, a cabinet for natural philosophy, clinical institutions of uncommon extent and order, to which have been added a Catholic theological seminary and a refectory. The paintings in the Academical Hall (among others, the great allegorical picture, the Christian Church) were executed by some pupils of Cornelius. To the liberality of the king the university owes also an anatomical hall, a new riding-school, and an edifice, once a royal palace in Poppelsdorf, ten minutes' walk from the city, which contains the mineralogical and zoological collections, and before which lies the botanical garden. Adjoining it are lands and buildings for the use of the agricultural institute. The tower of the old custom-house, which commands a fine view, is destined for an observatory. The teachers of the five faculties, of which the university consists, are above a hundred. Particular advantages are afforded for the education of young men intended for instructors. Many men distinguished in various branches of science are connected with the university. The historian Niebuhr, previous to his death in 1831, delivered lectures here. The exertions of the government to collect in Bonn all the means of instruction, united with the charms of the place and the beauties of the scenery, have made the university very much frequented. Its average attendance of students is above 900. The manufactures, which are not very important, consist chiefly of cottons, silks, and vitriol. The means of communication are ample, both by the steamers which ply upon the Rhine, and the railway connecting it with Cologne. Prince Albert studied at Bonn, and Beethoven was born there. Its antiquity is considerable, and, as the residence of the Electors of Cologne, it makes some figure in history.

BONNER, EDMUND, an English prelate of infamous notoriety, was the son of a peasant at Hanley, in Worcestershire, and was born about 1495. He was educated at Pembroke College, Oxford, where he was made D.C.L. in 1525. For his skill in business he was patronized by Cardinal Wolsey, from whom he received several clerical preferments. On the death of Wolsey he acquired the favour of Henry VIII., who made him one of his chaplains, and sent him to Rome to advocate his divorce from Queen Catharine. Here he conducted himself with so much intemperance, that the pope is said to have threatened to throw him into a caldron of boiling lead, on which he thought proper to return. In 1538 he was nominated Bishop of Hereford, being then ambassador at Paris; but before his consecration he was translated to the see of London. At the time of the death of Henry he was ambassador to the Emperor Charles V., but returned the same year (1547), when, refusing to take the oath of supremacy, he was deprived of his bishopric, to which, however, he was restored on making submission. Still continuing to act with contumacy, he was, after a long trial, once more deprived of his see, and committed to the Marshalsea (1549); from which prison, on the accession of Mary, he was released, and once more restored by commission. During this reign Bonner distinguished himself by a most sanguinary persecution of the Protestants, 200 of whom he was instrumental in bringing to the stake, whipping and torturing several of them with his own hands. When Elizabeth succeeded, he went with the rest of the bishops to meet her at Highgate, but at the sight of him she averted her countenance with an expression of horror. He remained, however, unmolested, until his refusal to take the oath of supremacy; on which he was once more committed to the Marshalsea (1560), where he remained a prisoner for nearly ten years, until his death in 1569. He was buried at midnight, to avoid any disturbance on the part of the populace, to whom he was extremely obnoxious.

BONNET, in fortification, an elevation of the parapet in the salient angles of a field retrenchment, or of a fortification, designed to prevent the enfilading of the front of the work, at the end of which it is situated. The bonnet accomplishes, however, only part of this object, and is subject, at least in field retrenchments, to the disadvantage, that the men destined for its defence are too much exposed to be taken in flank by the fire of the enemy, on account of the necessary elevation of the banquette (which see) —a fault which cannot occur in the works of a fortress which are well laid out.

BONNET, CHARLES, a natural philosopher and metaphysician, was born at Geneva in 1720, and exchanged the study of the laws for that of natural history. His essay On Aphides, in which he proved that they propagated without coition, procured him in his twentieth year the place of a corresponding member of the Academy of Sciences at Paris. Soon

afterwards he partook in the discoveries of Trembley respecting the polypus, and made interesting observations on the respiration of caterpillars and butterflies, and on the structure of the tape-worm. An active correspondence with many learned men in his own country and abroad, and too continued perseverance in labour, brought on an inflammation in his eyes, which prevented him from writing for more than two years. His active spirit employed this interval in meditating on the source of our ideas, on the nature of the soul, and on other mysteries of metaphysics. From 1752 till 1768 he was a member of the great council of his native city. He afterwards retired to his country-seat (Genthod), on the banks of the Lake of Geneva, where he led a retired life, devoting his time to the investigation of nature, to the conversation of learned men, and to an extensive correspondence, till his death in 1793. Bonnet was a close and exact observer. He carried religious contemplations into the study of nature. In his views of the human soul many traces of materialism are to be found; for instance, the derivation of all ideas from the movements of the nervous fibres. Of his works on natural history and metaphysics there are two collections; one in nine vols. 4to, the other in eighteen vols. 8vo, Neufchatel, 1779. The most celebrated are, Traité d'Insectologie; Recherches sur l'Usage des Feuilles dans les Plantes; Considérations sur les Corps organisés; Contemplation de la Nature; Essai analytique sur les Facultés de l'Ame; Palingénésie Philosophique; and Essai de Psychologie.

BONNET-ROUGE, which figured so much as an emblem of liberty during the French revolution, and was then worn as a head-dress by all who wished to show themselves sufficiently advanced in democratical principles, is said by some to have been adopted in imitation of the Phrygian cap of the same colour which was worn by those who had obtained emancipation from slavery, while others maintain that it had a much more lowly origin, and was borrowed either from the Marsellais bands who flocked to Paris, or from a few Swiss soldiers who, having been sentenced to the galleys for insubordination to their officers, obtained their liberty on the acceptance of the constitution in 1790. Having returned in a kind of triumphal procession, wearing the red cap, which had formed part of their galley dress, the fancy of the people was struck, and the bonnet-rouge was considered indispensable to every true patriot. Even the unfortunate Louis XVI. wore it when paraded through the streets, after narrowly escaping with his life from the mob which had burst into his palace. After it had ceased to be generally worn, it became the distinctive badge of the men of the Mountain. During the storms of more recent periods attempts have repeatedly been made to bring it again into fashion. These have not been successful, but the revolutionary cap rejected by France has met with a more favourable reception abroad, particularly among the newly-formed republics of America, where it is often stamped upon coins, or used as an emblem upon seals. Under the restoration of the Bourbons the soubriquet of bonnets-rouges was applied to individuals who either had figured in the revolution, or were supposed to hold revolutionary principles.

BONNEVAL, Claude Alexander, Count of, or Achmet Pasha, a singular adventurer, was born in 1675 at Coussac, in Limousin, of an illustrious French family, and entered in his sixteenth year the royal body-guard. In the war of the Spanish Succession he obtained a regiment, with which he marched to Italy, and distinguished himself by his valour as well as by his excesses. On his return he was obliged to fly, in consequence of some violent expressions against the minister and Madame de Maintenon. He was in 1706 appointed major-general by Prince Eugene, and fought against his native country. At the Peace of Rastadt in 1714, by the interference of Prince Eugene, the process against him for high treason was withdrawn, and he was allowed to return to his estates. In 1716 he was lieutenant field-marshal of the Austrian infantry, and distinguished himself by his valour against the Turks at Peterwardein (1716). In 1718 Bonneval was made a member of the imperial council of war, but his licentiousness and indiscretion induced Prince Eugene to get rid of him, by appointing him in 1723 master-general of the ordnance in the Netherlands. To revenge himself on Eugene, he sent complaints to Vienna against the governor, the Marquis de Prié; but the latter, who, on his side, had not been inactive, received an order to arrest Bonneval, and to imprison him in the citadel of Antwerp. Bonneval being afterwards ordered to appear at Vienna and give an explanation of his conduct, spent a month at the Hague before he chose to comply with the summons. He was therefore confined in the castle of Spielberg, near Brünn, and condemned to death by the imperial council of war; but the sentence was changed by the emperor into one year's imprisonment and exile. Bonneval now went to Constantinople, where the fame of his deeds and his humanity towards the Turkish prisoners of war procured him a kind reception. He consented to change his religion, received instructions in Mohammedanism from the mufti, submitted to circumcision, and received the name of *Achmet*, with a large salary. He was made a pasha of three tails, commanded a large army, defeated the Austrians on the Danube, and quelled an insurrection in Arabia Petræa. His exertions, as commander of the bombardiers, to improve the Turkish artillery, were opposed by the jealousy of powerful pashas, the irresolution of Mohammed V., and the dislike of the Turkish troops to all European institutions. He enjoyed, however, the pleasures of his situation. He died in 1747. The memoirs of his life published in London, 1755 (two vols. 12mo), in French by Desherbiers (Paris 1806, two vols.), under his name, are not genuine.

BONNYCASTLE, John, professor of mathematics at the Royal Military Academy at Woolwich, was born in Buckinghamshire. Though his education was not neglected, yet he was chiefly indebted to his own exertions for the various and extensive knowledge which he acquired. While young, he became private tutor to the two sons of the Earl of Pomfret. After two years he quitted that situation on being appointed one of the mathematical masters at Woolwich. Here, for more than forty years, he devoted his time to the duties of his profession, and to the composition of elementary mathematical works. His first production was the Scholar's Guide to Arithmetic, which has passed through many editions. His guides to algebra and mensuration are useful school books. He likewise wrote a Treatise upon Astronomy, the Elements of Geometry, a Treatise on Plane and Spherical Trigonometry, a Treatise on Algebra, and various articles in the early part of the last edition of Dr. Rees' Cyclopedia. He died at Woolwich, May 15, 1821.

BONPLAND, Aimé, a distinguished naturalist, noted as the friend of Humboldt, and the companion of his wanderings, was born at Rochelle on 22d Aug. 1773, studied medicine, and served for a while in the French navy as surgeon. Having returned to Paris to continue his studies, he there made the acquaintance of Humboldt, then a young man actively engaged in the pursuit of scientific knowledge at the French capital. On the latter projecting his journey

to the New World, Bonpland readily agreed to accompany him, and shared in all the adventures and toils of that celebrated expedition (see HUMBOLDT). In the course of it he collected upwards of 6000 plants, previously unknown, and on his return to France in 1804 presented his herbarium to the Museum of Natural History, and had a pension granted him by the Emperor Napoleon. A great friendship subsisted between him and the Empress Josephine, who frequently endeavoured to cultivate in her garden at Malmaison the flowers whose seeds he had brought from the tropics. On the Restoration he proceeded to South America, and became professor of natural history at Buenos Ayres. He subsequently made an extensive journey across the Pampas to the foot of the Andes, and ascended the river Parana into Paraguay, but was arrested by Dr. Francia, the governor of Paraguay, as a spy, and detained a prisoner for eight years till 1829. He afterwards settled at San Borja, near Monte Video, and continued to reside there till his death, which took place in the month of May, 1858.

BONY PIKE, or GAR-FISH (*Lepidosteus*), a remarkable genus of fishes of which there are more than twenty species, all inhabiting America. It is one of the few living forms that now represent the order of ganoid fishes so largely developed in previous geological epochs. Like other fishes of this order, it has the body covered with smooth enamelled scales of a rhombic form, arranged in oblique rows, and so hard that it is impossible to pierce them with a spear. The vertebral column is strongly ossified, and the individual vertebræ are of the 'opisthocelous' type, that is to say, convex in front and concave behind, thus exhibiting a reptilian character. The snout is elongated, and the jaws are furnished with double rows of teeth, the larger of which also resemble those of reptiles. The tail is heterocercal. These fishes inhabit the lakes and rivers of America, and frequent shallow, reedy, or grassy places. They are voracious animals, and fond of living prey. The common gar-fish, or bony pike (*L. osseus*), attains the length of 5 feet, and is easily distinguished by the great length of its jaws. The alligator gar-fish (*L. ferox*) is usually from 4 to 6 feet long, but is said sometimes to reach the length of 12 feet. The genus Polypterus, which inhabits the Nile and other African rivers, is allied to Lepidosteus.

BONZES, the name given by Europeans to the priests of the religion of Fo, or Buddha, in Eastern Asia, particularly in China, Birmah, Tonquin, Cochin-China, and Japan. As these priests live together in monasteries, unmarried, they have some resemblance to the monks of the Christian church. They do penance, and pray for the sins of the laity (or at least profess to do so), who secure them from want by endowments and alms. The female bonzes may be compared to the Christian nuns, as the religion of Fo suffers no priestesses, but admits the social union of pious virgins and widows, under monastic vows, for the performance of religious exercises. The bonzes are commonly acquainted only with the external forms of worship and the idols, without understanding the meaning of their religious symbols. They endeavour by every means in their power to keep up the superstition by which they are supported.

BOOBY (*Sula fusca*), a bird very nearly allied to the gannet, and so named from the extraordinary stupidity which all the older voyagers agree in attributing to it, who tell us that the birds would sit on the ground and allow themselves to be knocked on the head without attempting to fly. They are widely distributed over the globe, inhabiting the solitary islands and shores in most of the warmer latitudes. They live on fish, which they take, like the gannet, by darting down upon them when swimming near the surface of the water. When fishing, they are often tormented by the frigate-birds, which attack them and force them to disgorge their prey for their own benefit. They walk with difficulty and seldom swim, but they have wonderful powers of flight.

BOOK, the general name applied to a printed volume. In early times books were made of the bark of trees; hence the Latin *liber* means bark and book, as in English the words book and beech (A.-S. *boc*) may be connected. Some, however, derive book from *bugan*, to bend, as the Latin *volumen*, a roll or volume, from *volvo*, to roll. The materials of books were also derived from the *papyrus*, a plant which is a native of Egypt, and which gave its name to paper. The use of parchment, prepared from skins, next followed, until it was supplanted by paper in the twelfth century. See BIBLIOGRAPHY and PAPER; also the articles BOOKBINDING and BOOK-TRADE, which follow.

BOOKBINDING, the art of arranging and making up the sheets of a book into a volume. The first operation in bookbinding is to fold the sheets. If the book be folio, each sheet is folded into two leaves; if quarto, into four leaves; octavo, eight leaves; 12mo, twelve leaves; 18mo, eighteen leaves; and so of all others, to 72mo, the smallest size in general use. The first page of each sheet of all English books has, at the bottom, a letter of the alphabet, or a number, the letters or figures forming a consecutive series. These marks, technically denominated signatures, direct the workmen in the proper arrangement of the sheets. After the sheets are folded, they are arranged in the proper order. The book is then beat on a large smooth stone with a heavy hammer, or put through a rolling machine, to make it smooth and solid: care must be taken in beating or rolling it to prevent *setting off* the printing of the one page on the other, which may happen if the ink is not perfectly dry. After beating, the book is separated into three or four portions, and put between smooth hardwood boards, and pressed in a screw or hydraulic press for several hours. It is then carefully *collated*, according to the letter or number at the bottom of the sheet, and sawed on the back, in three or five places, according to the size of the work, in order to admit the cords on which it is to be sewed. When a book has been sewed, it is then secured by a coating on the back of strong glue, care being taken that the sheets be accurately adjusted at the head and back. When the glue has dried, the back is rounded with a hammer, the same as those used by shoemakers; it is then screwed up very tight in the *cutting press*, between hardwood boards, half the breadth of the book, and thinner on the one edge than the other; the boards being kept an eighth of an inch from the edge of the back. The back of the book is now beat smooth, and the edge of the back being beat on the edge of the boards that compress it, a groove is formed for the pasteboard to rest in. The pasteboards are then laced to the book by the ends of the cords on which it is sewed; after the lacing the superfluous parts are cut away, and the rest are hammered smooth. The book is then pressed again for several hours, to make it solid for cutting, which is performed by a machine called a *plough*. The boards ought always to be cut ¼ inch longer, and ⅛ inch broader than the book. The part of the board that projects is called the *squares*, and is a protection to the book.

When the book is cut, it may either be gilt, marbled (see MARBLING), or sprinkled on the edges, or left white, as all law-books are. In order to be gilt, the book is screwed hard up in the cutting press, between two *cutting boards*, and scraped perfectly smooth with a small circular piece of steel, having a sharp edge all round. It is now burnished with a

dog's tooth or agate burnisher; a solution of the white of egg and water being spread over with a sponge; and the gold is laid on with a piece of paper in the ordinary way. After having dried for about twenty minutes, the gold is then burnished.

Sprinkling the edges of a book is performed with a brush. Holding the brush in the right hand, and a bar of iron in the left, the workman dips the brush in the requisite solution, and having beat the brush on the bar till the colour is nearly out, the residuum falls fine, and produces the desired effect. The edges of sprinkled books are either burnished or not at pleasure. The usual compositions for sprinkling are a solution of umber, vermilion, sap-green, or indigo.

The head-band is now added, which is an ornament made of cotton cloth, thread, or silk, of two or three colours, placed at top and bottom of the book, across the leaves, and woven or twisted about a strip of vellum the width of the *square*. When the book is head-banded, it receives on the back another coat of strong glue; on the top of the glue is laid a piece of cartridge paper the size of the back, and rubbed smooth with a *folder*. The book is now ready for the leather cover. The cover, after being damped with a sponge and water, and having the edges pared thin on a marble stone, and the rough side smeared with strong paste made of flour, is now pulled on, and doubled over the edges of the boards. The sides and edges are then neatly squared and smoothed, and the bands at the back raised by working the cover with a bone paper-knife, the white or coloured lining papers are inserted, and the book is put for some hours into the press, after which it is ready for its ornaments and letters.

The letters or ornaments on books are made with brass tools engraved in relievo. Those parts of the leather on which gold is to be applied are glazed over two or three times with glair, each coating being allowed to dry before another is applied. When dry, the cover is slightly rubbed over with oil or hog's lard, and the gold laid on; the brass tools, after being heated to about 200° Fahr., are then impressed; the superfluous gold-leaf is rubbed off with a piece of cotton cloth. An iron tool, called *the polisher*, heated as above, is then applied, and the book, after being pressed for four or five hours in smooth japanned plates, is considered finished. Leather covers are also often used in which a pattern is previously embossed by means of a powerful fly-press acting on a metal die. The metal die rests on the lower bed of the press, and to the upper bed is attached a counter-die or millboard, which has received its impression from the metal die. Between the two the leather is embossed in an instant.

The above description applies chiefly to the binding of books in leather, and in the strongest manner; but an immense number of books are now bound entirely in cloth, a style of binding which, though less strong, is cheaper and more expeditious. In this case the book is very often left uncut, the projecting side and bottom edges being merely trimmed a little with a large knife without the folds of the paper being cut. The rounding of the back is now commonly effected by means of a machine for the purpose, instead of by the hammer. The cloth covers or 'cases' are made up complete—embossed, gilt, and lettered—before being attached to the book, the ornaments being stamped upon them by presses not very different, except in power, from the fly-press for embossing leather. The covers are attached to the books by means of strips of coarse thin canvas, which are glued to the backs of the books, and which project for ½ inch or ¾ inch on each side. These projecting strips are glued to the boards, and to conceal this arrangement, and give a neat finish to the book, some white or coloured lining paper is glued in. The books are then pressed for a few hours, and may now be said to be finished. So rapidly can books be done up in cloth, that in a large establishment as many as, say, 1000 copies of an octavo book can be finished in about six hours.

Another method of binding, which dispenses with the processes of sewing, gluing, and rounding, is now commonly practised in the case of engravings, atlases, manuscripts, &c., which are either in single leaves, or have little or no margin left for stitching. This method consists in smearing the back of the book, while placed in the press, with a solution of caoutchouc, by which means each paper edge receives a little of this tenacious substance, and all are firmly kept in their places. Such books open up quite flat at once.

No remains of ancient binding, before the art of printing, have been transmitted to our time. After the invention of printing, books were variously decorated in binding. Strength and durability appear to have been the first objects of attention. Sometimes the books were covered with velvet, but most commonly the covers were of wood, planed to a suitable thickness, over which leather or parchment was fastened. Sometimes brass ornaments were affixed to the sides, and pieces of brass were put on the corners of the books with the view of increasing their durability. Some of the most valuable books were covered with clear vellum, then overlaid with gold-leaf, and ornamented with various devices. Not unfrequently the year in which the book was bound appeared in large figures on the cover. In England the monks and students in monasteries were anciently the binders of books. Of their ingenuity and skill the various missals and other works preserved in our public and private libraries furnish abundant evidence. Lesné has sung the mysteries of bookbinding in a poem (1820, 8vo). For anecdotes relative to bookbinding, see Dibdin's Bibliomania and Bibliographical Decameron.

BOOK-KEEPING is the art or method of recording mercantile transactions according to any fixed system which a merchant or trader may adopt, with a view to making a detailed knowledge of the state or history of his business accessible to himself or others interested in it. A system of some kind is essential to book-keeping; but there is no absolute limit to the differences in detail which the various systems actually adopted may exhibit. There are, however, certain leading principles which, from the similarity of the facts involved, have come to be generally recognized, and which may be called the science, as a practical experience in the details of particular methods may be called the art of book-keeping. To these elementary principles we shall confine ourselves in this article.

Book-keeping is divided, according to the general method pursued, into single or double entry. Book-keeping by single entry is now comparatively little used, except in retail businesses, where, from the number of insignificant transactions, the cost of a formal record exceeds its value. Even in such businesses, however, a system of double entry may be adopted for generalizing the facts originally recorded, and this practice is being gradually adopted by the better class of tradesmen. Book-keeping by single entry is a simple record of transactions without any artificial system. Debts incurred are entered to the credit of the party to whom they are owing in a current or ledger account; debts due to the trader are entered to the debit of the party owing them in the same manner. These entries may be made from any subordinate book, a day-book, sales-book, or bill-book. Cash paid or received is debited or credited in the ledger to the account of the party receiving it or

paying it only when a current account is maintained with that party. A complete cash account does not form a necessary part of book-keeping by single entry, neither does a stock account. When cash and stock are kept, they are usually mere memoranda, having no bearing on the rest of the system. Simple and imperfect as this system is, it is capable, when carefully used, of producing some valuable results. When a balance-sheet of the debts owing and owed is made, this, together with stock and cash in hand, shows the exact state of the business. Theoretically, if stock and cash accounts are kept, the balance-sheet alone should show how the business stands; but it is a simple impossibility for a retail trader, by the system of single entry, to keep his books so accurately as to produce this result, and the attempt would only involve him in inextricable difficulties. Book-keeping by single entry is, however, much worse in practice than in theory; partly for the reason that most of those who bestow much attention on their books adopt the superior system, while those who keep books by single entry include the greater number of those who are careless or unskilful. Nothing is more common in such books than to find two or three current accounts opened for the same individual, a practice which always leads to hopeless confusion. The reason is that when one account gets into difficulties which there is not time to clear up, another is opened to keep future transactions, or it may be only a particular class of them, out of the muddle. These accounts sometimes lie open together for years, while different book-keepers succeed each other, and cross-posting goes on between them, which the system affords no means of checking, until the whole state of affairs becomes a chaos.

Book-keeping by double entry is a system first adopted in the great trading cities of Italy, thence carried to the Netherlands and to England, by which not only are the inconveniences of the method of single entry avoided, but a much more full and accurate account of the historical details of a business may be given. According to the manner in which it is applied, there is no series of financial facts connected with a business which cannot be clearly and systematically represented in this system without confusion or mixture with similar series of facts contained in the same books. The system consists in adopting, in addition to the personal accounts of debtors and creditors contained in the ledger, a series of what are called book accounts, which are systematic records in the form of debtor and creditor of particular classes of transactions. These accounts may be varied to any extent according to the nature of the business, and the kind of information intended to be conveyed by them. A foreign merchant may open an account for every separate shipment he makes, or he may have one account for each market, or for each particular consignee of his goods. A warehouseman may have an account for each particular class of stock, or a single stock account, or one for each department. Each of these book accounts affords an exhaustive record, from a particular point of view, of a certain class of facts; and the information which, when taken together, they are capable of affording is, in its own place, as indispensable for enabling a trader to carry on his business satisfactorily as a knowledge of his debtors and creditors. The name double entry comes from the fact of every entry being made in this system according to a logical relation established between the book and personal accounts opened in the ledger. For every debt incurred some consideration is received. This consideration is represented under a particular class or name in the ledger as the debtor in the transaction in which the party from whom the consideration is received is the creditor. Thus A buys goods to the value of £100 from B. He enters these in his journal—Stock Acct. Dr. £100 (for goods purchased) To B, £100. The first £100 appears in the Dr. column of the journal, and is posted in the ledger to the debit of Stock Account; the second appears in the Cr. column, and is posted to the Cr. of B. In like manner, when the goods are paid, Cash, for which an account is opened in the ledger, is credited with £100, and B is debited with the same. When the goods are sold (for cash) Stock is credited and Cash is debited. If the amount for which they sell is greater than that for which they were bought, there will be a balance at the debit of Cash, and a balance at the credit of Stock. The one balance represents the cash actually on hand (from this transaction), the other the cause of its being on hand. If there is a loss on the transaction, the balance will be on the other side of these accounts. Ultimately the balance thus arising at Dr. or Cr. of Stock is transferred to an account called Profit and Loss, which makes the stock account represent the present value of goods on hand, and the profit and loss account, when complete, the result of the business.

This simple illustration will suffice to show the principle of double entry. It is evident that on this principle the entries made on the debtor and creditor side of the ledger must always be exactly alike, and that the balance-sheet (a sheet containing the balances of all outstanding accounts in the ledger) must, if the entries are correctly made, balance exactly, and will not, as in single entry, show the state of the business by a balance on one side or the other. This information is transferred to the book accounts, where it is shown more accurately and in fuller detail. The risk of omitting any entry, which is a very common occurrence in single book-keeping, can hardly be incurred by any degree of carelessness consistent with the keeping of books by double entry. Unless a particular transaction is omitted in every step of its history, the system will inexorably require that its whole history should be given to bring the different accounts into harmony with each other.

In keeping books by double entry there is a natural division of the books composing the set into two classes, called principal and subordinate books. The subordinate books are those in which the transactions are first recorded, and vary both in number and arrangement with the nature of the business and the manner of recording the facts. The most important of these (all of which are not necessarily to be found in the same set) are Stock Book, Cash Book, Bill Book, Invoice Book, Account Sales Book. Sometimes a Waste Book or Day Book (blotter journal) is kept; but being superfluous, it is only a means of creating errors, and is generally banished from a well-organized system of book-keeping. In keeping subordinate books the thing of greatest importance is that they should be made up entirely from authentic documents; that is to say, from the documents actually constituting transactions, coming into or issuing out of the counting-house in which the books are kept. For this purpose all documents received must be carefully preserved and classified, and exact copies or records of all documents issued retained. Sometimes the record is made in the book itself. The bill-book is in fact such a record for bills. When the subsidiary book is not itself the original record of the transaction, it is the custom of the best-regulated counting-houses to make in coloured ink upon each document a reference to the book in which it is entered, and in each entry to the document from which it is taken. The principal books are composed exclusively from the subordinate books and classified documents of the business. In the most perfect system of double

entry they consist of two, the Journal and Ledger. The journal contains a periodical abstract of all the transactions contained in the subordinate books, or in documents not entered in books, classified into debits and credits. Each entry should contain a reference to the subordinate book or document from which it is taken, and every entry in a subordinate book, or every financial document not so entered, should contain a reference (in coloured ink) to a page in the journal in which it is entered. The ledger contains an abstract of all the entries made in the journal classified under the heads of their respective accounts. It is an index to the information contained in the journal, and also a complete abstract of the actual state of all accounts, but gives no further information; while the journal gives the reason of each debit and credit, with a reference to the source where the details of the transaction are to be found. In some systems bills and cash are posted directly into the ledger without passing through the journal. In this case the bill-book and cash-book form part of the principal set. It is better, however, to have a single book which contains the complete abstract of all transactions, and uniform posting to the ledger from a single book is likewise a convenience which outweighs the trouble of journalizing the bills and cash. In some businesses it is necessary to keep an account-current book. This is a book containing the details of the journal in the form of arrangement of the ledger. It is made up from the ledger and journal, and presents the various accounts of the business ready for rendering.

BOOKS, CATALOGUES OF. See BIBLIOGRAPHY.

BOOKS, CENSORSHIP OF. Unless we consider the burning of condemned books under the Roman emperors as a censorship, the establishment of this institution must be attributed to the popes; but it cannot be denied that it would have sprung up in a thousand other places even if it had not existed in their dominions. Soon after the invention of printing the popes perceived the influence which this art exerted over the diffusion of knowledge. It was besides doubly dangerous at a time when the authority of the church had been assailed, and was shaking under the load of its abuses. They endeavoured therefore to prohibit first the reading, and secondly the printing, of certain literary works. They enforced the ancient decrees of the church against the reading of heretical books, and introduced an ecclesiastical superintendency of the press in 1479 and 1496, which was more completely established by a bull of Leo X. in 1515. In this the bishops and inquisitors were required to examine all works before they were printed, and thus to prevent the publication of heretical opinions. They went still further: as this papal decree could not be carried into execution in all countries on account of the Reformation, they prepared an index of books which nobody was allowed to read under penalty of the censure of the church. This index was commenced by the Council of Trent, in the fourth session of which (1546) the decree of the censorship was renewed; but it was not executed, and was finally left to the popes (twenty-fifth session of 1563), by whom several such Indices Librorum Prohibitorum have been published. Even in recent times, in 1758, such an augmented index was issued. Works of an established character, which could not well be prohibited, it was determined to expurgate. The Duke of Alva caused such an Index Expurgatorius to be prepared in the Netherlands; another was drawn up at Rome in 1607, which, however, with the exception of some fragments, has remained secret. This censorship was soon afterwards adopted by the secular authority, and in some respects extended still further.

In Germany the politico-theological controversies gave the first occasion for the introduction of this institution, as they were carried on with the greatest violence on both sides. The decree of the German diet in 1524 prohibited them. By the diet of 1530 a more severe superintendence of the press was established; and this was confirmed by later laws of the empire in 1541, 1548, 1567, and 1577, &c. It was also provided at the Peace of Westphalia, 1648 (Osnabr. Instr., cap. v. sec. 50), that the states should not suffer attacks on religious parties. From that time the emperors have promised, in their elective capitulations, to watch strictly over the fulfilment of this article. In the capitulations of the Emperor Leopold II., 1790, and of the Emperor Francis II., it was further added (art. vi. sec. 8), 'that no work should be printed which could not be reconciled with the symbolical books of both Catholics and Protestants, and with good morals, or which might produce the ruin of the existing constitution, or the disturbance of public peace.' It was, however, not difficult in most Protestant countries for individual authors or literary journals to obtain an exemption from the censorship; and many institutions, academies, universities, &c., were privileged in this way as far as concerned their regular professors. The governments sometimes protected their subjects with great energy; as, for instance, that of Hanover, in the case of Putter and Schloezer.

In France the censorship belonged to the department of the chancellor, and was administered by royal censors. It was first abolished in England. It was formerly exercised by the well-known Star-chamber, and, after the abolition of this court in 1641, by the Parliament. In 1662 it was regulated by a particular statute, but only for a certain number of years. This statute was renewed in 1679, and again in 1692 for two years more. In 1694 the right of the crown to render the printing of writings, journals, &c., dependent on its permission—that is, the censorship—ceased entirely. In Holland, and even in the Austrian Netherlands, a great liberty, if not an entire freedom of the press, prevailed. All that was not permitted to be printed in France appeared in the Netherlands or in Switzerland, at Lausanne and Geneva, to the great advantage of the Dutch and Swiss book-trade.

In Sweden, by an edict of 1766, and accordingly under the aristocratical constitution, the abolition of the censorship was ordered; yet Gustavus III., personally a friend to the liberty of the press, was obliged to retain the censorship, and even to execute it with severity, during the aristocratical machinations which disturbed his reign, and which were but imperfectly counteracted in the revolution of 1771. Gustavus IV. issued an edict soon after he ascended the throne, by which the censorship was retained only in matters of religion, and was administered by the consistories. This, however, was not permanent: at first penalties were enacted, and in 1802 the censorship was entirely re-established, committed to the chancellor of the court, and executed with severity. French and German books were prohibited. King Charles XIII., immediately after his ascension to the throne, abolished it entirely by a provisional order of April 12, 1809, which was confirmed as an article of the constitution (sec. 86), June 6, 1809. In Denmark, by a royal rescript of Sept. 14, 1770 (under the minister Struensee), the censorship was wholly abolished; neither has it been restored, though the laws by which the liberty of the press has been regulated have been changing, and have sometimes been very oppressive.

In France the censorship, like so many other institutions, was annihilated by the revolution. All the

constitutions, from 1791 to the Charte Constitutionelle in 1814, declare the liberty of the press one of the fundamental laws. During the republic there was no censorship, but the revolutionary tribunals took its place. Napoleon restored it in another form by the decree of Feb. 5, 1810 (Direction de l'Imprimerie). Since the restoration it has also undergone various changes. Books of more than twenty sheets have always remained free, but the censorship has been exercised over pamphlets and journals at different periods. Under the government of the Emperor Napoleon III. the censorship was re-established with new penalties, and is still maintained.

In the Kingdom of the Netherlands the censorship was abolished by a fundamental statute of Aug. 24, 1815 (art. ccxxvi.), and this statute is still in force in the Kingdom of Holland. By art. xviii. of the constitution of Belgium, 1831, it is declared that the press is free, and that no censorship can ever be established. In the German states the liberty of the press was much restrained till 1806, the state-attorney having till then had control over it. After 1814 several states abolished the censorship—Nassau (decree of May 4, 1814), Weimar (in the constitution, May 5, 1816), Würtemberg (decree of Jan. 30, 1817), Bavaria (May 26, 1818), grand-duchy of Hesse (constitution of Dec. 17, 1820, sec. 35), though with very different provisions as to the responsibility of authors, printers, and booksellers. In accordance with the unhappy decrees of Carlsbad, 1819, and the resolutions of the German diet of Sept. 20, 1819, the censorship in all the states of the German Confederation became one of the conditions of union, but only with regard to books of less than twenty sheets, and journals. These laws were repealed in 1849, but in the course of a few years they were gradually introduced, although in a modified form, and in this form they still exist in most of the separate German states as well as in the empire. In Russia and Austria there is naturally a despotic censorship. In the United States of America a censorship has never existed.

Besides the different degrees of severity with which the censorship is exercised in different countries, it may be divided into different kinds, according to the field which it embraces. 1. A general censorship of the book-trade and of the press, under which even foreign books cannot be sold without the consent of the censors, exists in Russia, Austria, Spain, &c. (Austria has, in the censorship of foreign books, four formulas: A. *admittitur*, entirely free; B. *transeat*, free, but without public advertisements for sale; C. *erga schedam*, to be sold only to public officers and literary men on the delivery of a receipt; D. *damnatur*, entirely forbidden.) 2. A general censorship of the press, extending only to books printed in the country, exists in Prussia (edict of Sept. 19, 1788; order of the cabinet of Dec. 28, 1824; law of the 12th of May, 1851). 3. A limited censorship, only over works of less than twenty sheets, and journals, is at present the law in the states of the German empire. See PRESS (LIBERTY OF THE), and COPYRIGHT.

BOOK-TRADE. This employment, as one of the chief means of literary intercourse, occupies an important place in the history of civilization. Even in ancient times, and accordingly before the invention of printing, the trade had attained a high degree of development, especially among the Romans, and the poet Horace mentions the brothers Sosii as the chief booksellers in Rome in his time. After the fall of Rome down to the twelfth century, the trade in books was almost entirely confined to the monasteries, and consisted chiefly in the copying of manuscripts and the barter or sale of the copies, generally at a very high price. But about that time the foundation of the universities gave a new form to the trade in books, at first in Bologna and Paris. A statute of the University of Paris of the year 1323 distinguished between 'stationarii,' booksellers properly so called, who bought books or got them copied on their own account, and again sold them or lent them out; and 'librarii,' that is, dealers in books, who received books at a certain commission from one party and sold them again to others. The trade of both classes, who were regarded as belonging to the university, was regulated by statutes. But besides the booksellers in the university towns, we find also in other places, particularly in Italy, buyers and sellers of manuscripts. In Germany in the fifteenth century Diebold Lauber at Hagenau is conspicuous as a bookseller offering for sale a large store of the most favourite books, 'spiritual and secular, and for the most part finely illuminated.' It was quite natural that the invention of printing in the same century should have a powerful effect on the trade of bookselling. The influence of this art on bookselling was first manifested in the commercial towns and free cities of the German empire. As might have been expected the printers were originally at the same time booksellers, and they were in the habit of disposing of their books at the chief market-towns and places frequented by pilgrims. Fust, one of the inventors of printing, brought the productions of his press to Paris for sale, and Schöffer, the inventor of the process of casting metal types in a mould or matrix, brought the books which he had printed to Frankfort-on-the-Main, whose world-renowned fairs soon became the centre of the German book-trade. But that booksellers sometimes took their works to other places for sale is shown by several booksellers' notices of the years 1470 to 1486 giving intimation of the sale of books at Strasburg, Augsburg, and other towns. Instances of the separation of bookselling and printing are to be found even in the fifteenth century, but it was only in the following century that these two branches of trade began generally to be carried on independently.

The two chief departments of the book-trade are publishing and bookselling by retail in all its branches. For the most part these two departments of the trade are carried on separately, but it is not uncommon for them to be united. The publisher of a book is the one who purchases the copyright of a work, with the condition of printing it at his own cost and making it accessible to the public. Very frequently, however, books are printed at the cost of the author or some learned society, and published on commission; and in this case also the one who brings the book before the public by means of the retail booksellers or otherwise, and whose name appears on the title-page, is called the publisher, although properly speaking the publisher is the one by whom the charges are borne. The sum that is paid by a publisher for the copyright of a work frequently depends on the sale which it has. In order to secure as large a sale as possible, the publisher commonly brings himself into connection with the retail booksellers. The members of this branch of the trade deal in works that have been given to the world by various publishers, from whom they obtain supplies of such new works as belong to their own line of business, and also furnish upon order copies of works that they do not keep in stock.

Second-hand booksellers belong to a special department of the retail book-trade. They deal for the most part in old books, which are no longer to be had in the usual way from the publishing houses, but also in new books that are offered at reduced prices. The second-hand book-trade carried on in Great Britain is very extensive, and employs many dealers. The price of old books depends very much on their condi-

tion; but independent of this circumstance it is very fluctuating and capricious; equally good copies of the same works being frequently to be had in some shops for half or a third of what they can be bought for in others.

In England the chief seats of the book-trade are London and Edinburgh, but publishing is also carried on to a considerable extent in Dublin, Manchester, Glasgow, and some other places. The publishers may either deal with the booksellers directly, whom they supply with stock on a running account at a certain fixed deduction from the selling price which is marked on the book, or they may deal with them by means of commission-agents. Large publishers have very frequently commission-agents in the principal cities of the kingdom, and these of course have to supply the booksellers at the same rate as the publishers. In France the centre of the book-trade is Paris, where almost all the books appear which make any pretensions to occupy an important place in literature, and it is an exceptional case when any scientific work appears in the provinces, for which a sale may be expected outside of the district in which it is published. It is even a matter of some difficulty to procure a copy of a book which has appeared at some provincial publishing-house, unless the publisher engages some bookseller in Paris to sell the work on commission. The French publisher usually has a running account with comparatively few retail booksellers or commission-agents, and the credit that is allowed is commonly three, at the most six months. The deduction that is granted by the publisher is quite arbitrary in amount, and often, especially in the case of periodicals and strictly scientific works, very small. It sometimes happens also that the original price of a book is raised, when an edition is almost exhausted and there is little probability of the work being reprinted. All the French booksellers are *brevetés*, that is, licensed and sworn to abide by certain prescribed rules. This regulation is justly complained of by the publishers. The Belgian book-trade, which until the conclusion of the treaty of Aug. 22, 1852, between France and Belgium, consisted chiefly in the reprinting of French works, is now closely connected with that of France in its organization. The book-trade of North America, the chief seats of which are New York, Philadelphia, and Boston, is now very considerable. The manner in which it is conducted is almost the same as in England.

The book-trade in Germany presents some peculiarities deserving of attention. The common practice there is for the booksellers to receive supplies of new books from the publishers, 'à condition,' that is, in commission, with liberty to send back to the publisher all the copies that are not sold before the time of settlement at the Easter Fair (Ostermesse), or to carry over a part of them to next year's account if the sale has so far been unsuccessful. This is a practice which is rare in other countries, and in France entirely unknown. All business between the publishers and retail booksellers is carried on indirectly by means of commission-agents, especially in Leipzig, but also in Berlin, Vienna, Frankfort, Stuttgart, Nürnberg, and Augsburg. What is most characteristic of the German book-trade consists in the completeness of the organization of this kind of agency, and it is this also that forms the great advantage of the German system when compared with the systems of other countries. At one time, as has been already mentioned, Frankfort was the centre of the German book-trade, but about the end of the seventeenth century it gave place to Leipzig, and the fair held at the latter city at Easter is now the occasion on which all the accounts made in the book-trade during the past year are settled. Formerly the booksellers appeared personally at the fair, but this is at present but rarely the case, every bookseller out of Leipzig having his agent there, who conducts all his business, and stands in constant communication with the other booksellers. A large number of the publishers deposit with their agents at Leipzig a stock of the works which they have published, and commission them to carry out all orders on their account. The retail bookseller sends all his orders to his agent, who communicates them to the Leipzig publishers and the agents of the other publishers. The books that are ordered, if they are in store in Leipzig, are at once supplied by the agent of the publisher to the agent of the retail bookseller, who then despatches them to his principal. If they are not in Leipzig, the order is sent on to the publisher, who then sends to his agent the required supplies of books, which are by the same means as before sent on to the retail bookseller. The commission agency is organized in a similar way, although with certain modifications, at all the other places mentioned above. The sale of the productions of the German press is constantly increasing. In most of the chief cities out of Germany there are establishments which devote themselves chiefly to this branch of the business, and which have their agent at Leipzig, and as a rule stand in direct communication also with all the publishing houses of Germany. In Holland, Denmark, Sweden, and Norway are many institutions resembling that of Germany. The book-trade of Poland is carried on to a considerable extent by means of agents at Leipzig. The Russian trade is as yet without any regular organization. In Italy, too, there is no central point either for the production of books or for the conduct of the trade by means of agents. Florence, Milan, and Turin have in both respects nearly the same position.

On an average of the four years ending with 1852, it was estimated by Macculloch that 2796 new works and 903 new editions and reprints (exclusive of pamphlets and periodical publications) were annually published in Great Britain, being a total of 3699. This was considerably above the average number of *volumes* published during the period 1839–42, or ten years previously, when the average annual number of volumes of new works was 2149, of reprints and new editions, 755. The total number of works published in Great Britain in 1872 was 4519, of which 3419 were new books, and 1100 new editions. Among the new books those connected with theology had the first place in point of numbers, 570 new books of this class having been published; works of fiction came next, being 468 in number; works on arts and science, and illustrated works, numbered 373; educational, classical, and philological, 348; poetry and the drama, 272; history, biography, &c., 235; voyages and travels, 172, &c.; the same year this country exported 81,510 cwts. of books of the declared value of £883,149. The catalogue of the German book-fair for 1564 contained 256 books; in 1601 the number had risen to 1137; at the present time the annual number of German publications is stated at about 12,000. France is said to produce annually about the same number, and it would thus appear that the literary activity of both these countries is much greater than that of our own. The statistics, however, do not afford a very satisfactory ground of comparison, as no uniform definition of what constitutes a book, or mode of estimating the number published has been adopted.

BOOMERANG, a missile instrument used by the Australian aborigines. It is of hard wood, about the size of a common reaping-hook, and in shape resembling the letter A, but with a rounded top, and no stroke across: in scientific language, the shape is a

parabola. It is about 2½ inches broad, ⅛ inch thick, and 2 feet long, the extremities being rounded. One side is flat, the other is rounded, and it is brought to a bluntish edge. The boomerang is taken by one end, with the bulged side downwards, and the convex edge forward, and thrown directly onward as if to hit some object standing 30 yards in advance. Instead of going directly forward and there falling to the earth, it slowly ascends in the air, whirling round and round, till it reaches a considerable height, when it begins to retrograde, and finally it sweeps over the head of the projector, and falls behind him. It is one of the ancient instruments of war of the Australian aborigines. They are said to be very dexterous in hitting birds with it. Attempts have been made to apply the boomerang principle in the construction of screw-steamers, but the results have not been satisfactory.

BOONDEE, a principality, Hindoostan, in Rajpootana, under British protection; bounded on the N. by Jeypoor and Oonjara, on the W. by Jaighur, on the S. and E. by Kotah; area, 2500 square miles. It was pretty extensive before Kotah and its territory were separated from it. In 1817 more than half the revenues was usurped by Scindia and Holcar, and the peasantry were impoverished by oppressive exactions, but in 1818 the rajah received a considerable addition of territory, together with the town of Patun, from the British government. Although small, Boondee is important as the medium of communication between the N. and S. The inhabitants are of the Hara tribe, which has given birth to many famous men, and, among others, to Ram Singh Hara, one of Aurungzebe's most renowned generals. Boondee, the capital, is picturesquely situated, and its antiquity, numerous temples, and magnificent fountains, give it a very interesting appearance. For picturesque effect its main street is almost unequalled. At its upper extremity stands the palace, a remarkable edifice, built of stone, with turreted windows and battlements, supported partly by the perpendicular rock, and partly by solid piers of masonry 400 feet high. At its lower extremity is the great temple dedicated to Krishna.

BOONE, DANIEL, one of the first adventurers who penetrated into the wilds of Kentucky, was born in Virginia, 1735. He was, almost from his infancy, addicted to hunting in the woods. He emigrated early to North Carolina, then recently settled. Having determined to cross the wilderness bordering on the Cumberland Mountains, in quest of the region of Kentucky, then little known, he set out on his expedition, with five companions, May 1, 1769. June 7, they arrived at Red River, N. of the Kentucky. A short time afterwards, Boone and one of his companions, John Stewart, were captured by a party of savages. They soon escaped, but could discover no traces of their friends, who had returned home. Boone and Stewart would have been constrained to follow them, had not Squire Boone, the brother of Daniel, pursued their track from North Carolina and relieved them with a few necessaries. Shortly afterwards, Stewart was killed by the Indians, and the two Boones were left the only white men in the wilderness. They passed the winter in a cabin. In May, 1770, Boone's brother returned home. In July of the same year, however, he came back, according to agreement. They then traversed the country to the Cumberland River, and, the following year, returned to their families, with a determination of removing with them to Kentucky. In September, 1773, Boone commenced his removal to Kentucky, with his own and five other families, and was joined by forty men, who placed themselves under his guidance. Being attacked by the Indians, six of his men were slain, and the cattle belonging to the party dispersed. The survivors returned, in consequence, to the settlements on Clinch River, about 40 miles from the scene of action. A company of North Carolina, having formed a plan of purchasing the lands on the S. side of the Kentucky River from the southern Indians, employed Boone to buy a tract of country, the limits of which were described to him. He performed the service, and soon after made a road from the settlements on the Holston to the Kentucky River, notwithstanding the incessant attacks of the Indians, in which four of his men were killed and five wounded.

In April, 1775, he built a fort at a salt-spring, on the southern bank of the Kentucky, where Boonesborough is now situated. It consisted of a blockhouse and several cabins, inclosed with palisades. In 1777 he sustained two sieges in Boonesborough from the Indians, but repulsed them. In the following year, however, Feb. 7, Boone was taken prisoner by the savages, while hunting, with a number of his men. In May they were conducted to Detroit, where they experienced great kindness from Governor Hamilton, the British commander of that post. He even offered the Indians £100 for their prisoner, in order that he might liberate him on parole, but they would not part with him, having conceived for him sentiments of great affection and respect. On his return he was adopted by one of the principal chiefs at Chilicothe, and might have been happy in this situation, had not the thoughts of his wife and children continually kept alive the desire of escape. This he effected one morning, having risen at the usual hunting hour, and departed, apparently for the woods, but in reality for Boonesborough. He arrived there on the 20th of June, after a journey of 160 miles, which he performed in four days, having eaten, it is said, but one meal during that time.

On the 8th of August, a body of savages, to the number of 450, commanded by Canadian Frenchmen and some of their own chiefs, invested the fort, with British colours flying. The attack was continued until the 20th of August, when the enemy abandoned the siege. This was the last attempt of the Indians to possess themselves of Boonesborough. In October, as Boone was returning from the Blue Licks with his brother, the latter was slain, and Boone pursued by a party of Indians for 3 miles, by the aid of a dog; but, having killed the animal, he escaped.

In 1782, the depredations of the savages increasing to an intolerable extent, Boone, with other militia officers, collected 176 men, and went in pursuit of a large body, who had marched beyond the Blue Licks to a bend of the main fork of the Licking River, 40 miles from Lexington. They overtook them, August 19, but being much inferior in numbers, were obliged to retreat. General Clark, then at the falls of the Ohio, immediately assembled a considerable number of men, and commenced the pursuit of the savages, accompanied by Boone. From that time until 1798 Boone resided alternately in Kentucky and in Virginia. In that year he removed to Upper Louisiana, where he received a grant from the Spanish authorities of 2000 acres of land. His children, friends, and followers were also presented with 800 acres each. He settled with them on the Missouri River, at Charette, some distance beyond the inhabited parts of the country, where he followed his usual course of life—hunting and trapping for bears—until Sept., 1820, when he died, at the residence of his son, Major A. Boone.

BOORHANPOOR, a town in India, in the Deccan, province of Candeish, of which it was the ancient capital, on the N. side of the Taptee, the banks of which are here very lofty. When viewed from the

opposite side of the river, it presents rather an imposing appearance. Many of the streets are wide, regular, and paved with stone; as are also the Raj Bazaar and the market-place, an extensive square, the two handsomest places in the town. The most remarkable public edifices are the Lal Kilah, or Red Fort, a palace built by Akbar, and though much dilapidated, exhibiting still many remains of imperial magnificence; and the Jumma Musjeed, or great mosque, built by Aurungzebe. A singular sect of Mohammedans, named Bohrah, have their headquarters here. They are the chief merchants in this part of India, have Arab features, wear the Arab costume, and derive their origin from a disciple of their great Prophet. Boorhanpoor was formerly famous for its muslin and flowered silk manufactures, which are still carried on to a considerable extent. Pop. 50,000.

BOORO, one of the Molucca Islands in the Indian Archipelago, W. of Amboyna, belonging to the Dutch. It is oval in shape, 92 miles long, and 70 broad. It has several bays, of which Cajeli is the largest, and contains a safe harbour sheltered from the monsoons. Viewed from this bay the island has a very fine appearance. In the foreground the minarets and native houses are seen through the openings of the rich tropical vegetation; while lofty mountains, wooded to their summits, shut in the view. The island is watered by 125 streams, large and small. On the N.W. side there are vast swamps, swarming with crocodiles. The island contains some high mountains—Mount Dome having an altitude of 10,400 feet. Booro produces a variety of valuable woods, balsams, resins, and odoriferous flowers. The only article of export is cajeput oil, of which about 8000 bottles are obtained yearly; most of which are sent to Java. The tree from which it is obtained (*Melaleuca cajeputi*) grows also upon the islands of Amboyna, Ceram, Celebes, and Sumatra; but the best oil is procured in Booro. The pop. consists of Alfoories in the interior, and Malays on the coast.

BOOROOGIRD, BURUGIRD, or BOOROJERD, a town, Persia, province of Irak-ajemi, capital of the government of same name, 190 miles N.W. from Ispahan, with a castle and several mosques. It lies in a fertile and well-cultivated valley, yielding saffron, belonging to the Lack tribe. Pop. 12,000.

BOOTAN, or BHOTAN, an independent state of N. Hindostan, having Bengal and Assam on the S., Sikkim on the W., and Tibet on the N., its eastern boundaries being imperfectly known: area about 19,000 square miles. It forms a portion of the declivity of that stupendous Alpine chain of which Tibet occupies the table-land. Notwithstanding it is mountainous, and in many parts extremely cold, the country is productive and highly cultivated, the slope of the mountains being cut into terraces for this purpose. As it is situated without the tropics, it is free from periodical rains; and the climate is, in general, moderate, calculated to bring forth both European and Asiatic fruits and vegetables. Thus we find the trees and shrubs of Northern Europe in sight of the large forests, and a rank vegetation of plants strictly tropical. The Deb Rajah is the ruler in temporal affairs; but there is also a spiritual ruler, the Dherma Rajah. Their rule is more nominal than real, however, there being several almost independent chiefs. A yearly tribute is paid to Tibet. The inhabitants are robust, active, and courageous. They have the Tartar features, and profess the Buddhist religion. Their houses are, in general, of only one story, but the palace of the rajah is a lofty pile. From the precipitous nature of the country they are obliged to use numerous bridges, many of which are constructed with ropes and iron chains. Bootan produces a hardy breed of horses, about 13 hands high, of a piebald colour and fine symmetry. Rice, wheat, and barley are the chief crops. Bootan trades with all the neighbouring countries, but chiefly with Tibet and Bengal, exchanging horses, linen cloth, musk, walnuts, oranges, Indian madder, &c., for woollens, cotton, sandal-wood, indigo, and spices. The chief manufacture is that of paper made from the bark of a tree, from which material a fabric like silk and satin is also manufactured. The inhabitants are estimated at from 40,000 to 50,000 families, besides about 10,000 of the priestly class. Tassisudon is reckoned the capital, and contains a palace in which the rajahs reside. Wandipore and Paro are the other chief towns. The Bootanese have often given trouble to the English; and in 1865 they had to cede a part of their territory and a number of hill-forts.

BOÖTES (that is, ox-driver, from Gr. *bous*, an ox), a northern constellation, called also by the Greeks *Arctophylax*. Arcturus was placed by the ancients on his breast; by the moderns, on the skirt of his coat. Fable relates that Philomelus, son of Ceres and Jasion, having been robbed by his brother Plutus, invented the plough, yoked two bulls to it, and thus supported himself by cultivating the ground. Ceres, to reward his ingenuity, transferred him, with his cattle, under the name of *Boötes*, to the heavens.

BOOTH, BARTON, an actor of great celebrity in the reigns of Queen Anne and George I., was born in 1681, and placed under Dr. Busby, at Westminster School. An early attachment for the drama was fostered by the applause he met with while performing a part in one of Terence's plays, at the annual exhibition in that seminary. He eloped from school at the age of seventeen, and joined Ashbury's company of strolling players, with whom he went to Dublin. After performing three years in the Irish capital with great applause, he returned in 1701 to London, and, engaging with Betterton, met with similar success. On the death of that manager he joined the Drury Lane company, and on the production of Cato in 1712 raised his reputation as a tragedian to the highest pitch by his performance of the principal character. It was on this occasion that Lord Bolingbroke presented him from the stage-box with fifty guineas—an example which was immediately followed by that nobleman's political opponents. Declamation, rather than passion, appears to have been his *forte*, though Cibber speaks of his Othello as his finest character. He became a patentee and manager of the theatre in 1713, in conjunction with Wilks, Cibber, and Doggett, and died May, 1733. He was buried in Westminster Abbey, where there is a monument to his memory. He was the author of Dido and Æneas, a mask, various songs, &c., and the translator of several odes of Horace.

BOOTH, HENRY, Earl of Warrington, born of an ancient family in 1651, represented the county of Chester in several parliaments during the reign of Charles II., and distinguished himself by his zeal against the Roman Catholics and his opposition to the Duke of York. In 1684 he became, by the death of his father, Lord Delamere, and about the same time was arrested and confined in the Tower. On two subsequent occasions, after James II. had succeeded, he was imprisoned, and was brought to trial on a charge of high treason, but acquitted; afterwards remained in retirement till the Revolution of 1688, when William III. appointed him chancellor of the exchequer, and made him a peer under the title of the Earl of Warrington, at the same time bestowing on him a pension of £2000, in consideration of his eminent services in raising troops to deliver his country and religion from tyranny and Popery. He died at London in 1693. His works, consisting chiefly of speeches

in Parliament and political tracts, have been published in one volume 8vo.

BOPAL. See BHOPAL.

BOPP, FRANZ, one of the most distinguished philologists of modern times, born at Mainz, Sept. 14, 1791; died at Berlin, Oct. 23, 1867. With the intention of devoting himself exclusively to the study of oriental literature, he went in 1812 to Paris, where he remained five years and enjoyed the friendship of Chézy and Silvestre de Sacy. He then lived for some time in London and at Göttingen, and in 1821 received an extraordinary professorship in the University of Berlin, which continued to be his place of residence during the remainder of his life. In 1822 he became a member of the Academy of Sciences there, and in 1825 was appointed ordinary professor of oriental literature and general philology. By his editions of Sanskrit texts—several episodes from the great Indian epic poem Mahabharata, with translations and notes (Lond. 1819; 2d ed. Berl. 1832; with a metrical translation, 1838); Ardschuna's Reise nach Indra's Himmel (Ardschuna's Journey to Indra's Heaven; Berl. 1824); and Diluvium (Berl. 1829)—and the preparation of highly useful grammatical works, he contributed greatly to the advancement of the study of the old Indian language. But his most important contribution to philology is his Vergleichende Grammatik des Sanskrit, Zend, Griechischen, Lateinischen, Litauischen, Altslawischen, Gothischen, und Deutschen (Comparative Grammar of the Sanskrit, Zend, Greek, Latin, &c.; Berl. 1834; 2d ed. greatly altered, three vols. 1857–61; 3d ed. 1868–71). An English translation was published in three vols. 1845–50. The great value of this work lies in this, that here for the first time it was clearly demonstrated that the languages of all the races belonging to the great Indo-Germanic stock have arisen out of a common tongue, which now indeed no longer exists as a separate language, but the structure of which we are able, by a philological comparison of the sister languages sprung from it, to restore to a great extent with almost mathematical certainty. Among the numerous other works of Bopp, his Critical Grammar of the Sanskrit Language (Kritische Grammatik der Sanskritsprache; Berl. 1834; 4th ed. 1868) deserves mention.

BORA, KATHARINA VON, wife of Luther, was born in 1499. She took the veil very early in the nunnery of Nimptschen, near Grimma; but feeling very unhappy in her situation, applied, with eight other nuns, to Luther, whose fame had reached them. Luther gained over a citizen of Torgau, by the name of Leonard Koppe, who, in union with some other citizens, undertook to deliver the nine nuns from their convent. This was done the night after Good Friday, April 4, 1523. He brought them to Torgau, and from thence to Wittenberg. At the same time, to anticipate the charges of his enemies, he published a letter to Koppe, in which he frankly confessed that he was the author of this enterprise, and had persuaded Koppe to its execution; and he also exhorted the parents and relations of the virgins to admit them again into their houses. Some of them were received by citizens of Wittenberg; others who were not yet too old Luther advised to marry. Among the latter was Katharina, whom Philip Reichenbach, at that time mayor of the city, had taken into his house. Luther proposed to her (by his friend Nicholas von Amsdorf, minister in Wittenberg) Dr. Kaspar Glaz and others in marriage. She declined these proposals, but declared her willingness to bestow her hand on Nicholas von Amsdorf, or on Luther himself. Luther, who in 1524 had laid aside the cowl, was not averse to matrimony, yet appears to have been led to the resolution of marrying by reason rather than by passion. This step gave rise to many disadvantageous rumours, some of them as shameful as they were unfounded. After Luther's death, Katharina removed from Wittenberg to Leipzig, where she was compelled to take boarders for her support. She afterwards returned to Wittenberg, and finally removed to Torgau, where she died, Dec. 27, 1552. In the church of Torgau her tombstone is still to be seen, on which is her image, of the natural size.

BORACIC ACID, BORAX, BORON. Boracic acid, uncombined but not pure—for it is often mixed with sulphur—is found abundantly as a beautiful sublimate in small pearly crystalline scales in the crater of Volcano, one of the Lipari Islands. In Tuscany it is contained in the steam which, along with sulphureous exhalations, ammonia and other substances, issues from fissures in the soil. On account of its having been obtained at Sasso, the acid is called by mineralogists sassolin. It occurs besides in mineral waters, and combined with various metals in minerals, of which boracite, hayesine, natroborocalcite, stassfurtite, and tincal, the native borate of sodium or borax, are the most important. The acid is generally prepared for chemical purposes by decomposing a hot solution of borax with sulphuric acid. As the solution cools, the boracic acid forms a crystalline crust over the fluid, and gradually deposits on the sides of the vessel. It is collected, and after washing and recrystallization is tolerably pure. It forms pearly hexagonal scales, with a somewhat greasy feeling, and a bitterish taste. It dissolves in water and very readily in alcohol, to the flame of which it imparts a peculiar green colour. The acid is further characterized by turning the yellow colouring matter, turmeric, brown. When an aqueous solution of the acid is heated, the steam carries away considerable quantities of the acid with it; but if the acid be heated alone, the water it contains is expelled, then the acid fuses, and is converted into a white or gray glassy mass, called vitrified boracic acid. In this state it is not volatilized except at temperatures approaching a white heat. Hence at high temperatures it expels the more volatile acids, such as sulphuric, from their compounds, while the reverse is the case in solutions at low temperatures.

The preparation of boracic acid from its native aqueous solutions is an interesting process, on account of the natural obstacles which have to be surmounted. The apparently simple operation of concentrating the water in which the acid is dissolved is one of great practical difficulty, because in Tuscany, where the solution is found, there is no available fuel. This drawback has been overcome by Count of Monte Cerboli, Sig. Lardarello, who has contrived to utilize the volcanic heat of the district to concentrate the solution. The method has been so successful that eight or nine large works spread over a district of several square miles contrive to produce upwards of 800 tons of boracic acid per annum. The following is an outline of the process:—Round the cracks in the soil, called fumaroles, or *soffioni*, from which the steam containing not a half per cent. of the acid issues, and inclosing the small lakes or lagoons in which it condenses, brick tanks are built on different levels, but communicating with each other. These are supplied with cold water, in which the steam is further condensed. As the steam passes up under considerable pressure, the water in the lagoons seems to boil, and it is sometimes projected to a considerable height in the air. When the water is sufficiently saturated it is run off into a deep vessel, where it is allowed to stand until the black mud mechanically suspended in it deposits, and then the clear fluid is run into a series of large shallow evaporating pans of lead. These pans are heated by steam from other soffioni, which

is made to pass under them by a system of flues. As the evaporation proceeds, the fluid becomes richer in boracic acid, and when it has at last reached a certain specific gravity, it is passed into a deep vat, where it is allowed to cool, and where the boracic acid deposits. In this state it is impure, but it is improved by recrystallization, and it is then packed in casks and exported. Commercial boracic acid contains sometimes as much as 25 per cent. of foreign matter, consisting of sulphates and other salts of the alkalies, of calcium and magnesium, clay, and other impurities. The most important of these foreign matters is ammonia, which is present in such quantity that it is regularly collected when boracic acid is converted into borax.

This is the almost sole use to which the acid is put, and it is effected by dissolving crystallized carbonate of sodium in water, and then adding the proper amount of boracic acid. During the combination carbonate of ammonium is given off, which is saved by passing it into sulphuric acid.

Previous to the utilization of the Tuscan boracic acid, native borax was imported, under the name of *tincal*, from India. As imported it is in small pieces of a dirty yellowish colour, and is covered with a fatty or soapy matter. The tincal was formerly purified in Venice and in Holland by a process which was kept secret, but which consisted apparently in boiling it with lime to remove the fatty matter, filtering from impurities, and after some labour getting it in crystals. The tincal is found in various salt lakes in Asia, and a description of one of these is given in a paper on the Botany and Geology of Thibet, appended to Captain Samuel Turner's Visit to the Court of Teshoo Lama (London, 1800, 4to, 406). The lake, said to be some 20 miles round, is situated in a bleak mountainous region, fifteen days' journey northward from Teshoo-lama, and is frozen for the greater part of the year. It is supplied only by springs, and its level varies very little. The water contains common salt and borax, and large deposits of these compounds are continually forming in the bottom and on the border of the lake. During summer the natives go to the lake, break up the masses, and send them to Calcutta and other ports. The crude tincal is employed in Thibet for soldering and as a flux. The crude tincal, after being greased, is exported; but sometimes it has been subjected to partial purification before exportation.

Since the Tuscan method was introduced, and since other sources of boracic acid in North and South America, and still more recently in the salt mines at Stassfurt, have been rendered available, the demand for tincal has not been so pressing, and the price of borax has been reduced.

Pure borax, the anhydroborate of sodium, forms large transparent six-sided prisms, which dissolve readily in water, effloresce in dry air, and when heated melt in their water of crystallization, swell up, and finally fuse to a transparent glass. In this state borax dissolves metallic oxides, which frequently impart to it characteristic colours. From this property borax is employed in soldering metals, as it removes films of oxide, and leaves the metals in metallic contact with each other and with the solder. It is also employed in making fine glaze for porcelain, as it renders the materials more fusible. In medicine it is employed in ulcerations and in skin diseases.

Another native compound of boracic acid is the borate of magnesium, or *boracite* of mineralogists. It occurs in beds of anhydrite and gypsum at various localities in Germany, in the form of small cubes, which are colourless, though they are sometimes of different tints, and which are truncated on the edges and on four of the solid angles. This mineral is remarkable for becoming, when heated, electrified negatively at the perfect angles, and positively at the truncated angles. It is slowly soluble in water and in acids, and is fusible before the blow-pipe. A heteromorphous variety of this mineral is called stassfurtite, because it is found in the salt mines of Stassfurt. It is used as a source of boracic acid and borax. Hayesine, occurring in Nova Scotia, and tiza, occurring near Iquique in South Peru, are double borates of calcium and sodium containing water and traces of sulphuric acid and chlorine. They are found in small soft rounded lumps, which, when broken, present a silky appearance from consisting of a mass of the finest crystalline threads interwoven with one another.

These compounds are derived from the element *boron*, which was discovered about the same time by Gay-Lussac and Thénard, and by Sir Humphry Davy. The separation was effected by decomposing vitrified boracic anhydride with potassium, and purifying the resulting boron by washing with water and hydrochloric acid. Other methods have been since contrived which are more convenient and economical. Obtained by these processes, boron is a dark brown or green amorphous powder, which stains the skin, has no taste or odour, and is only slightly soluble in water. It does not change, except in density, when exposed even to a white heat, provided it be surrounded by a gas with which it does not combine; but if it be heated in the air, or in oxygen, it burns more or less brilliantly, and is converted into boracic anhydride. It is also acted on to a greater or less extent by chemical reagents, such as sulphuric, nitric, and hydrofluoric acids, by chlorine, by alkalies, alkaline salts, &c. It is one of the few elements which combine direct with nitrogen.

Besides the amorphous boron, which corresponds with the amorphous form of carbon, there is another which resembles the diamond, and is accordingly called the adamantine or diamond boron. Boron is therefore an *allotropic* substance. The diamond form is prepared either by heating the amorphous boron with aluminium in a crucible suitably arranged, or by heating a mixture of a boron compound with aluminium, or with aluminium and carbon. After the action is over, the boron is found crystallized in the aluminium, from which it is removed mechanically, or by dissolving away the alumina and other impurities present. The diamond boron, however, is said to contain small quantities of carbon (as diamond) and aluminium, and to owe its properties in some measure to their presence. Thus three varieties, of different colours, shapes, and composition, have been described, so that it seems doubtful how far the adamantine is an allotropic condition of the element. The substance, however, is infusible in the oxyhydrogen blow-pipe, and undergoes only superficial oxidation when heated in oxygen. It is not attacked by acids, and only slowly by fused alkalies and alkaline carbonates and sulphates. It is extremely hard: so hard that it scratches ruby, and its dust has been used for polishing diamonds.

Boron forms compounds with the non-metallic elements, of which that with oxygen already described is the most important.

From various considerations, especially that of its allotropy, boron has been generally classed along with carbon and silicon. It seems more accurate, however, to put them in separate groups, as the chemical analogies between it and the other two are by no means so striking as was formerly supposed.

BORAGO, or BORAGE, a genus of plants belonging to the nat. order Boragineæ, and characterized by soft, mucilaginous, and emollient properties. *Borago officinalis* gives a coolness to beverages in

which its leaves are steeped, and from the exhilarating qualities which it was erroneously supposed to possess, ranked with alkanet, roses, and violets as one of the four cordial flowers.

BORAX. See BORACIC ACID.

BORDA, JEAN CHARLES, an engineer, and afterwards a captain in the French marine, famous for his mathematical talents, was born at Dax, in the department of Landes, in 1733. In 1756 he was chosen a member of the Academy of Sciences, and occupied himself in making experiments on the resistance of fluids, the velocity of motion, and other topics relating to dynamical science. In 1767 he published a dissertation on hydraulic wheels, and afterwards one on the construction of hydraulic machinery. In 1771, with Verdun de la Crenne and Pingré, he made a voyage to America, to determine the longitude and latitude of several coasts, isles, and shoals, and to try the utility of several astronomical instruments. In 1774 he visited the Azores, the Cape Verde Islands, and the coast of Africa for the same purpose. In the American war he was very useful to the Count d'Estaing by his knowledge of navigation. In later times he visited a second time the Azores, the Cape Verde Islands, and the coast of Africa; but the observations which he made in this voyage have not been published. Borda was the founder of the schools of naval architecture in France. He invented an instrument, of a very small diameter, which measures angles with the greatest accuracy, and which has been used in measuring the meridian; the reflecting circle, which has made his name immortal; besides an instrument for measuring the inclination of the compass-needle, and many others. On the establishment of the National Institute, he became one of its members, and was occupied with other men of science in framing the new system of weights and measures adopted in France under the republican government. Among the latest of his labours was a series of experiments to discover the length of a pendulum which should vibrate seconds in the latitude of Paris. The principal of his writings are his Voyage, published in two vols. in 1778, and his Tables Trigonométriques Décimales, which have been edited by Delambre. He died at Paris in 1799.

BORDEAUX, one of the most important cities of France, capital of the dep. of Gironde, is situated on the left bank of the Garonne, about 70 miles from the sea, and 284 S.W. of Paris. The pop. is 194,241. It is built in a crescent form round a bend of the river, which is lined with fine quays for more than 3 miles, and is crossed by a magnificent stone bridge of seventeen arches, finished in 1821 at a cost of £260,000. There is another bridge, a fine iron structure, for the railway from Paris. Bordeaux consists of an old and a new town, the boundary between them being formed by a wide and handsome street which, commencing at the quay near the centre of the crescent, stretches across the city from E. to W. The old town, lying to the S. of this street, is mostly composed of irregular squares and narrow crooked streets; while the new town is laid out with great regularity, and on a scale of magnificence hardly surpassed by any provincial town in Europe. The objects chiefly deserving of notice in the old town are the arch called the Porte de Bourgogne at the extremity of the bridge, forming the principal entrance to the town; the cathedral, a fine Gothic edifice built at different periods; St. Michael's Church, with a lofty detached tower, and a superb front of florid Gothic; the Church of St. Croix, a specimen of gorgeous Romanesque; the bourse or exchange, the custom-house, the Hotel de Ville, once the residence of the Archbishops of Bordeaux, and the Palais de Justice. The new town is not so rich in public buildings. The most conspicuous are the library (140,000 vols.), the museum, and the theatre, a Grecian structure, regarded as the handsomest edifice in Bordeaux. Among the beneficent establishments the first place is due to the grand hospital or infirmary, which occupies the highest site in the town and is admirably arranged. Few cities are so well supplied with extensive and finely-planted promenades. Bordeaux is the seat of a court of appeal, of courts of the first instance and of commerce; and has an academy of science, literature, and art; a preparatory school of medicine and pharmacy; a lyceum; a normal school for female teachers; a school of hydrography and navigation; a school of painting and design; a botanic garden, an observatory, various literary and scientific associations, and a branch of the Bank of France. There are consuls resident here from all the states of Europe and North and South America. The position of Bordeaux gives it admirable facilities for trade, and enables it to rank next after Marseilles and Havre in respect of the tonnage employed. Large vessels can sail up to the town, which by railway, river, and canal communicates with the Mediterranean, with Spain, and with the manufacturing centres of France. The chief exports are wine and brandy; drugs, dyes, and fruits are also largely exported. Sugar and other colonial produce and wood are the chief imports. Ship-building is the chief branch of industry, and there are also sugar-refineries, woollen and cotton mills, potteries, soap-works, distilleries, &c.

Bordeaux is the *Burdigala* of the Romans. In the fifth century it was in possession of the Goths, and it was pillaged and burned by the Normans. By the marriage of Eleonor, daughter of the last Duke of Aquitaine, to Louis VII., it fell into the hands of France. But in 1152 the princess was repudiated by her husband, and married to Henry of Anjou, who ascended the throne of England in 1154, as Henry II., and transferred Bordeaux to that crown. After the battle of Poictiers, Edward the Black Prince carried John, king of France, prisoner to Bordeaux, where he resided eleven years. Under Charles VII., in 1451, it was restored again to France. In 1548 the citizens rebelled on account of a tax on salt, and the governor De Morems was put to death, for which the constable of Montmorency inflicted a severe punishment on the city. During the revolution it was devastated as the rendezvous of the Girondists, by the Terrorists, almost as completely as Lyons and Marseilles. The oppressiveness of the continental system to the trade of Bordeaux made the inhabitants disaffected to the government of Napoleon, so that they were the first to declare for the house of Bourbon, March 12, 1814. The Roman poet Ausonius was a native of Bordeaux. Montaigne and Montesquieu were born in the neighbouring country, and the latter lies buried there in the church of St. Bernard. For the wines of Bordeaux, see BORDELAIS WINES.

BORDELAIS WINES. The finer red wines of the Bordelais (country round Bordeaux) are the best which France produces. They contain but little alcohol, keep well, and even improve by removal. As the original fermentation is complete, they are, if judiciously managed, less subject to disorder and acidity than the Burgundy wines. None of the very best quality, however, is exported pure; a bottle of the best Château-Margaux, or Haut-Brion, is a rarity hardly to be procured in Bordeaux itself, at the rate of six or seven francs a bottle. For export, the secondary growths of Médoc are mingled with the rough Palus. The red wines of the Bordelais are known in England and North America under the name of *claret*. They have less aroma and spirit, but more astringency than the Burgundy wines.

The Bordelais are the safest wines for daily use, as they are among the most perfect of the light wines, and do not easily excite intoxication. They have been accused of producing the gout, but without reason. Persons who drench themselves with madeira, port, &c., and indulge in an occasional debauch of claret, may, indeed, be visited in that way; because a transition from the strong, brandied wines to the lighter is always followed by a derangement of the digestive organs.

The principal vineyards are those of Médoc, Graves, Palus, and Vignes Blanches; after these, those of Entre-deux-Mers, St. Emilion, and the Bourgeais are the most important. The first growth of Médoc, Graves, Palus, and Vignes Blanches; after these, those of Entre-deux-Mers, St. Emilion, and the Bourgeais, are most important. The first growth of Médoc are the famous wines of Château-Margaux, Lafitte, and Latour. The Lafitte is characterized by its silky softness on the palate, and a perfume partaking of violet and raspberry. The Latour is fuller, has more aroma, but less softness. The Château-Margaux is lighter than the Latour, and delicate like the Lafitte, but has not so high a flavour. Of the second growth, we may mention the Rauran and the Léoville. The average produce of the first growth is 100 *tonneaux* (of 217 gallons each). The soil of Médoc is a sandy and calcareous loam. The gravelly lands (*les Graves*) to the S. and W. of Bordeaux produce the Graves. The first growth of the red Graves is the Haut-Brion, which rivals the first growth of Médoc; it has more colour and body, but is inferior in aroma and taste. The principal white Graves are St. Bris and Carbonieux. The best Médoc ought to be kept three or four years before removal; the Graves five or six. The wines of Palus, which is a bed of rich alluvial deposits, are inferior to the preceding; they are stronger and more deeply coloured than those of Médoc. Being hard and rough, they are improved by a voyage, and are principally sent to the East Indies and America as *vins de cargaison*, or are mixed with Médoc which is intended for exportation. By the voyage they become more light and delicate, but are not to be compared with the growths of Médoc and the Graves. The best are Queyries and Mont Ferrand. The former are deeply coloured, and have much body. Age gives them an agreeable aroma, resembling that of a raspberry.

Among the white Bordelais wines, besides those already mentioned, the finest growths are Sauternes, Preignac, Barsac, and Bommes. Martillac and St. Médard are of a good quality, and have lightness and body. Dariste, formerly *Dulamon*, is equal to St. Bris and Carbonieux. Among other red wines are the Bourgeais, which are of a fine colour, and acquire by age lightness and an agreeable almond aroma: of all the Bordelais wines they most resemble the Burgundy wines. The first growths are Debosquet, Château-Rousset, Tajac, and Falfax. The Bourgeais wines were formerly preferred to Médoc. The wines of St. Emilion have been much esteemed. The Fronsac and Canon are the best. Those of Entre-deux-Mers become agreeable with age. The *vins des Côtes* are good *vins ordinaires;* they are generally *fermes* and hard, and improve by age. The best are those of Bassens and Cenon. See Henderson's History of Ancient and Modern Wines.

BORDENTOWN is a pleasant town in New Jersey, on the E. side of the Delaware, 26 miles N.E. of Philadelphia. It has several large foundries and other extensive manufacturing establishments. It was some time the residence of Joseph Bonaparte, ex-king of Spain. Pop. 6041.

BORDONE, PARIS, a celebrated painter of the Venetian school, born at Treviso in 1500; died in 1570. Under Titian he made rapid progress in painting. The execution of many works for his native city and for Venice spread his fame as far as France, whither he was invited by the king. The galleries of Dresden and Vienna possess several of his pieces. His most famous picture is the Old Gondolier Presenting a Ring to the Doge; it is painted in oil, and now to be seen at Venice.

BORE, a name probably of Indian origin, and used to designate a very remarkable phenomenon which occurs in some rivers in spring-tides. At such times as the tide advances the water is suddenly thrown in as if in a mass, and then pursues its course up the river, and in opposition to the current, presenting a volume of water moving with great rapidity and resistless force, and with a height varying from 2 or 3 feet, as in the Severn, Trent, Solway, and Dee, to more than 12 feet in the Brahmapootra. The circumstances in which the bore occurs afford an easy explanation of its cause, and show that it is produced by the disproportion between the volume of the tidal wave and the receiving power of the rivers into which it is thrown.

BOREAS, the north wind, worshipped by the Greeks as a deity; residing in Thrace, and represented with wings, which, as well as his hair and beard, were full of flakes of snow; instead of feet he had the tails of serpents, and with the train of his garment he stirred up clouds of dust. Boreas was the son of Astræus and of Eos. When Apollo and his favourite Hyacinthus were once playing at quoits, he blew the quoit of the former, of whom he was jealous, upon the head of the youth, who was killed by the blow. By Oreithyia, daughter of Erechtheus of Athens, he was father of Cleopatra, Chione, Calais, and Zetes. The last two partook in the Argonautic expedition.

BORELLI, GIOVANNI ALFONSO, born at Naples in 1608, after studying medicine, both practised and professed it at various places, but particularly at Pisa and Florence, and distinguished himself as the leader of those who have been called mathematical physicians, from regarding the human body as a kind of hydraulic machine, and then attempting to explain all its motions and functions in accordance with the principles of mathematics. He died at Rome Dec. 31, 1679. He appears to have possessed very original and inventive powers, and made various discoveries, among which may be mentioned that of an apparatus apparently of the nature of a diving-bell, by which persons could descend into the water, remain in it and move about or rise and sink at pleasure, and of a boat by which two or more persons might row themselves beneath the water in any direction. His works discuss many important subjects in medicine, mathematics, and philosophy; but the great work on which his fame rests, though not published till after his death, is entitled De Motu Animalium, and in so far as it relates to mere animal mechanics properly so called, is full of interest and instruction; but when he attempts to apply his mathematical principles to the action of the heart, lungs, liver, and other viscera, he falls into egregious blunders, and stumbles at every step.

BORGHESE, a Roman family, which derives its origin from Sienna, and which held the highest offices in this republic from the middle of the fifteenth century. Pope Paul V., who belonged to this family, and ascended the papal chair in 1605, loaded his relations with honours and riches. In 1607 he appointed his brother, Francesco Borghese, leader of the troops sent against Venice to maintain the papal claims; bestowed the principality of Sulmone on Marco Antonio Borghese, the son of his brother Giovanni Battista; granted him a considerable revenue,

and obtained for him the title of a grandee of Spain. Another of his nephews, Scipione Caffarelli, he created cardinal, and made him adopt the name of Borghese. From Marco Antonio Borghese, prince of Sulmone, is descended the rich family of Borghese.

BORGHESE, Camillo Philip Louis, formerly Duke of Guastalla, Prince of France, &c., was born in 1775 at Rome; died at Florence April 10, 1832. When the French invaded Italy he entered their service, and showed great attachment to the cause of France, in particular to General Bonaparte. In 1804 he became a French prince, and grand cross of the Legion of Honour, and at the breaking out of the war against Austria in 1805, commander of a squadron of the imperial guard. After its termination his wife received the duchy of Guastalla, and he was created Duke of Guastalla. After having served in 1806 in the campaign against the Prussians and Russians, and after having been sent to Warsaw to prepare the Poles for a revolt, the emperor appointed him governor-general of the provinces beyond the Alps. He fixed his court at Turin, and became very popular among the Piedmontese. After the abdication of Napoleon he broke up all connection with the Bonaparte family, and separated from his wife. The prince sold to the French government for the sum of 8,000,000 francs 322 works of art which ornamented the palace of his ancestors, known under the name of the *Villa Borghese*. Among them were several master-pieces: for example, the Borghese Gladiator, the Hermaphrodite, the Silenus, the Dying Seneca, Amor and Psyche. Bonaparte provided for the payment out of the national domains in Piedmont, which the King of Sardinia confiscated in 1815; at the same time, in consequence of the second invasion of France, the prince received back part of these treasures of art. In 1818 he sold Lucedio, in Savoy, for 3,000,000 livres. In the Kingdom of Naples he possessed the principalities Sulmone and Rosano. He was one of the richest Italian princes.

BORGHESE, Marie Pauline, Princess, the beautiful sister of Napoleon, was born at Ajaccio October 20, 1780. When the English occupied Corsica in 1793 she went to Marseilles, where she was on the point of marrying Fréron, a member of the Convention, and son of that critic whom Voltaire made famous, when another lady laid claim to his hand. The beautiful Pauline was then intended for General Duphot, who was afterwards murdered at Rome in December, 1797; but she bestowed her hand from choice on General Leclerc, then at Milan, who had been in 1795 chief of the general staff of a division at Marseilles, and had there fallen in love with her. When Leclerc was sent to St. Domingo with the rank of captain-general, Napoleon ordered her to accompany her husband with her son. She embarked in December, 1801, at Brest, and was called by the poets of the fleet, the *Galatea of the Greeks*, the *Venus Marina*. Her statue, in marble, as Venus, was made by Canova at Rome—a successful image of the goddess of beauty. She was no less courageous than beautiful, for when the negroes under Christophe stormed Cape François, where she resided, and Leclerc, who could no longer resist the assailants, ordered his lady and child to be carried on shipboard, she yielded only to force. After the death of her husband, November 23, 1802, she married at Morfontaine, in 1803, the Prince Camillo Borghese. Her son died at Rome soon after. With Napoleon, who loved her tenderly, she had many disputes and as many reconciliations, for she would not always follow the caprices of his policy. Yet even the proud style in which she demanded what her brothers begged made her the more attractive to her brother. Once, however, when she forgot herself towards the empress, whom she never liked, she was obliged to leave the court. She was yet in disgrace at Nice when Napoleon resigned his crown in 1814, upon which occasion she immediately acted as a tender sister. Instead of remaining at her palace in Rome, she set out for Elba to join her brother, and acted the part of mediatrix between him and the other members of his family. When Napoleon landed in France she went to Naples to see her sister Caroline, and afterwards returned to Rome. Before the battle of Waterloo she placed all her diamonds, which were of great value, at the disposal of her brother. They were in his carriage, which was taken in that battle, and was shown publicly at London. He intended to have returned them to her. She lived afterwards separated from her husband at Rome, where she occupied part of the palace Borghese, and where she possessed, from 1816, the Villa Sciarra. Her house, in which taste and love of the fine arts prevailed, was the centre of the most splendid society at Rome. She often saw her mother, her brothers Lucien and Louis, and her uncle Fesch. When she heard of the sickness of her brother Napoleon, she repeatedly requested permission to go to him at St. Helena. She finally obtained her request, but the news of his death arrived immediately after. She died June 9, 1825, at Florence. She left many legacies, and a donation, the interest of which was to enable two young men of Ajaccio to study medicine and surgery. The rest of her property she left to her brothers, the Count of St. Leu and the Prince of Montfort. Her whole property amounted to 2,000,000 francs.

BORGIA, Cesare, the natural son of an ecclesiastic, who afterwards became Pope Alexander VI., and of a Roman lady named Vanozza. At a time when the court of Rome was a school of falsehood and licentiousness, and compacts and oaths afforded no security, he reduced crime to a system. Other princes have shed more blood, have exercised more atrocious cruelty, but his name is stigmatized with the greatest infamy; for with Borgia all was calculated with cool reflection. He profaned whatever was most holy for the attainment of his purposes. His father, who had become pope in 1492, invested him with the purple. When Charles VIII. of France made his entry into Rome Alexander was obliged to treat with him, and delivered Cesare Borgia into his hands as a hostage, who escaped, however, a few days after from the camp of the king. In 1497 Alexander bestowed the duchy of Benevento, together with the counties of Terracina and Pontecorvo, on his eldest son, who had already received from the King of Spain the duchy of Gandia. Cesare became jealous of his elevation, and when the Duke of Gandia was murdered, a week after his investiture, public opinion accused his brother Cesare of the deed. His father permitted him to lay aside the purple, and devote himself to the profession of arms, and sent him to France to carry to Louis XII. the bull for divorce and dispensation for marriage which he had long desired to obtain. Louis rewarded Borgia for the compliance of his father with the duchy of Valentinois, a body-guard of 100 men, and 20,000 livres a year, and promised to aid him in his projects of conquest. In 1499 Cesare married a daughter of King John of Navarre, and accompanied Louis XII. to Italy. He first undertook the conquest of Romagna, expelled the lawful possessors of the land, caused them to be treacherously murdered, and himself to be appointed by his father Duke of Romagna, in 1501. In the same year he wrested the principality of Piombino from Jacopo d'Apiano. He also endeavoured, though in vain, to make him-

self Duke of Bologna and Florence. In 1502 he announced that he was about to attack Camerino, and demanded for that purpose soldiers and artillery from Guidobaldo of Montefeltro, duke of Urbino. Camerino was taken by storm, and Giulio di Barona, the lord of the city, with both his sons, was strangled at the command of Borgia. This fate he prepared for all whom he had robbed. Those who did not fall into his hands he pursued with poison or the dagger. Meanwhile all the petty princes had united, and collected the soldiery for their defence; but Cesare Borgia terrified some by means of 3000 Swiss, whom he called to Italy, and gained over others by advantageous offers. Thus he dissolved their alliance, seized their lands, and saw no further obstacle to his being made, by his father, King of Romagna, of the March, and of Umbria, when Alexander VI. died, Aug. 17, 1503. At the same time Cesare Borgia was attacked by a severe disease, at a moment when his whole activity and presence of mind were needed. He found means, indeed, to get the treasures of his father into his possession, assembled his troops in Rome, and formed a closer alliance with France; but enemies rose against him on all sides, one of the most bitter of whom was the new pope, Julius II. Borgia was arrested and carried to Spain, where he remained for two years in prison. He at length made his escape to his brother-in-law the King of Navarre, went with him to the war against Castile, and was killed by a shot before the castle of Viana, March 12, 1507.

BORGIA, Lucrezia, daughter of the infamous Pope Alexander VI., and sister of Cesare Borgia, when a mere child was betrothed to a gentleman of Aragon, but her father, on attaining the popedom, thought the match beneath her, and made no scruple of breaking the former engagement, and marrying her to Giovanni Sforza, lord of Pesaro. After she had lived with him for four years, Alexander, pretending to have discovered a cause of nullity, dissolved the marriage, and gave her to Alphonso, duke of Bisceglie, natural son of Alphonso II. of Aragon. Two years after this new husband was assassinated by the hired ruffians of Cesare Borgia. Lucrezia, though she had three husbands, was now for the first time a widow; but not choosing to remain so, was, within the course of a year, married to Alphonso d'Este, son of Ercole, duke of Ferrara. Here she appears to have conducted herself more creditably than before, and became a liberal patroness of poets, who endeavoured to repay her benefactions by lauding her as the pattern of every virtue. It is very doubtful how far such eulogiums can outweigh the historical evidence which has been brought to prove her guilty of every species of enormous crime; but Roscoe, the historian of Lorenzo de' Medici and Pope Leo X., has endeavoured to clear her reputation from the stains which have been cast on it. She died at Ferrara in 1523.

BORGIA, Stefano, Cardinal, born at Veletri in 1731, was brought up by his uncle, Alexander Borgia, archbishop of Fermo, and in 1750, on becoming a member of the Etruscan Academy of Cortona, commenced at Veletri to form a museum, which has since become one of the richest private collections in existence. In 1759 he was appointed by Benedict XIV. governor of Benevento, and in 1770 he became secretary to the College of Propaganda, which brought him into immediate relation with missionaries to all parts of the world, and enabled him, at comparatively little expense, to enrich his museum with MSS., coins, statues, idols, and all the other rarities which each country possessed. In 1789 Pius VI. made him a cardinal, and at the same time appointed him inspector-general of the foundling hospital, into which, if such an institution can be deemed either worthy or capable of improvement, he introduced extensive reforms. In 1797 the revolutionary spirit which had broken out in France extended itself to Rome, and the pope, as the best means of counteracting it, gave all his confidence to Borgia, and installed him as dictator. The situation was extremely difficult, but he showed himself worthy of the trust, and gained such ascendency over the public mind that tranquillity and good order remained uninterrupted till 1798. By this time the French were at the gates, and the popular party, becoming dominant, established a republic. The pope was compelled to depart, and Cardinal Borgia, at first arrested, was ordered, on obtaining his liberty, to quit the Papal States. After disembarking at Leghorn he repaired to Venice and Padua, and continued regularly to discharge his functions in connection with the Propaganda as if nothing had occurred to interrupt them. He returned to Rome with the new pope, Pius VII., who treated him with the same confidence as his predecessor. Afterwards, when Pius VII. was carried off to France, Borgia was ordered to accompany him, and he accordingly set out, but had only reached Lyon when he was seized with a serious illness, and died in 1804. He was the author of several antiquarian and historical works, and deserves honourable mention for his liberal patronage of arts and artists.

BORGOGNONE, Jacopo Cortesi, born in 1621 at St. Hippolite in Burgundy, studied painting under his father, but enlisted in the army, and remained in it for three years. On his return he resumed his art, and went to Bologna, where he attracted the notice of Guido, and became an inmate in his house, where he made good use of the valuable opportunities of improvement thus afforded him. After realizing an independence he visited his native place. He, however, returned again to Italy, and after painting with much success resolved to become a Jesuit. He was accordingly admitted into the order at Rome in 1655, but he appears to have painted as diligently as ever. He died in 1676. He is remarkable for freedom of design, and the vividness with which his pictures bring the subjects which they represent before the mind. In his battle-field, for instance, the spectator not only sees the scene, but almost imagines himself in the very heart of it, hearing the cries and shrieks and the roaring of the artillery.

BORING is a species of circular cutting, in which a cylindrical portion of a substance is gradually removed. When tubes of metal are to be formed a cast is, in some cases, made in solid metal, and the whole of the bore is produced by the boring machine: in others the cast is made hollow at first, and the borer is only used to give uniformity and finish to the inside of the tube. In boring cannon sometimes the tool is made to revolve while the cannon is at rest, and sometimes the cannon is made to revolve while the tool is at rest. By the latter arrangement the bore is said to be formed with more accuracy than by the other method of putting the borer in motion. The tool is kept pressed against the cannon by a regular force. Cylinders of steam-engines are cast hollow, and afterwards bored; but in this case the borer revolves, and the cylinder remains at rest. In either case the axis of the borer and that of the cylindrical material should coincide; for otherwise, if the borer revolve, it will perforate obliquely; if the material revolve, the perforation will be conical. In some of the more recent cylinder-boring machines the cylinder is kept perpendicular to the horizon, which seems to insure more accuracy than by the ordinary method. The instruments used are gimlets, augers, centre-bits, drills, &c. Drills are made to turn rapidly, either in one direction by means of a

lathe-wheel and pulley, or alternately in opposite directions by a spiral cord, which coils and uncoils itself successively upon the drill, and is aided by a weight or fly. See CANNON and MINING.

BORLASE, WILLIAM, born at Pendeen, near St. Just, in Cornwall, in 1696, studied at Oxford, entered into orders, and became successively rector of Ludgvan and vicar of St. Just. The richness of Cornwall in mineral products and antiquities gave a direction to his studies, and he began making collections with the view of afterwards giving a description of his native county. In 1750 he was elected a Fellow of the Royal Society, to which he had communicated a valuable paper on the spars and crystals of the Cornish mines, and for many years after he continued to write in its Transactions. In 1754 he published his Antiquities of Cornwall, and in 1758 he completed the work by publishing his Natural History of Cornwall. He died in 1772. He kept up a correspondence with the most eminent men of his day, and was on intimate terms with Pope, whom he furnished with materials for his grotto at Twickenham. Dr. Borlase's name, formed out of crystals, is still to be seen there.

BORNEO, corrupted by the Portuguese from *Bruni* or *Burné*, that is, *country*, called by the natives *Tanah Kalamantin*, or *Pulo Kalamantin*, and likewise *Dahak-Waruni*, is, with exception of Australia, the largest island in the world. On the S. it is bounded by the Java Sea; on the E. by the Strait of Macassar and the Sea of Celebes; on the N. by the Sooloo Sea, and by the China Sea on the W. and N.W. Its circumference is about 3000, its greatest length 780, and its greatest breadth 690 miles; area estimated at 275,000 to 286,000 square miles. In former times only the coasts were known to Europeans, but of late years part of the interior has been explored by various travellers, of whom Müller, Von Kessel, St. John, and Wallace may be named. The range of mountains of the crystalline formation on the N.E. coast, which terminates in the Kini-Balu, extends probably through the whole island. In regard to the rivers, we have only a partial knowledge of the lower part of their course. Among the lakes which have been discovered are Sumbah and Seriang, in the S.W. of the island; the existence of Lake Kini-Balu, near the mountain of the same name, is doubtful. In the districts on the coast the climate is hot and damp, and therefore extremely prejudicial to Europeans, producing dysentery, intermittent fever, small-pox, and cholera. The rainy season lasts, on the W. coast, from November to May, and the thermometer, in the S., ranges from 82° to 93° Fahr. Borneo contains immense forests of iron-wood, teak, and other trees, besides producing various dye-woods, nutmegs; camphor, cinnamon, pepper, ginger, rice, cotton, bamboos, &c. Its fauna is likewise considerable, comprising elephants, rhinoceroses, leopards, bears, tigers, ounces, buffaloes, deer, and monkeys, likewise horses, swine, goats, sheep, dogs, and other domestic animals—among the birds, eagles, vultures, hawks, parrots, owls, birds of paradise, flamingoes, and peacocks. There are also snakes, lizards, tortoises, bees, silkworms, &c. The mineral productions consist of gold, antimony, iron, tin, and zinc in the interior and west, besides crystals and diamonds. The population is stated at about 3,000,000, probably an overestimate. They are divided into Malays, Dyaks, Papuans, Chinese, and Bugis, and there are also a few Javanese, Hindoos, and Arabs. The Malays, the predominating and most cultivated race on the sea-coast, possess great hardihood, but are extremely dangerous from their covetous and vindictive disposition. The Dyaks, dwelling more towards the interior, were unquestionably the earliest inhabitants of the island, and are a finely-formed race, of a yellow complexion, but savage and cruel. The Papuans, or Negritos, are likewise probably aborigines, and occupy the most inaccessible forests and retreats, living in caves and on trees. The emigrant Chinese, numbering about 250,000, devote themselves to trade and mining. Lastly, the Bugis, chiefly emigrants from Celebes, live among the Dyaks, and have become rich and powerful by commerce, and still more by piracy.

It is only the land on the coast which is well cultivated. Trade is in the hands of the Bugis, and exports in those of the Malays, the Dutch, and the British, who, along with the Malays and Chinese, import opium, tea, and various manufactures. The south-western, southern, and eastern portions of the island, or about two-thirds of the whole, are possessed by the Dutch, under whom are a number of semi-independent princes. Among the native sovereignties may be mentioned the Kingdom of Sambas, on the W. coast, the sultan of which has several rajahs under him; and on the S. coast the Kingdom of Banjermassing, with the town of Banjermassing, containing a pop. of 30,000, and having a considerable trade. On the N.W. coast is the Malay kingdom of Borneo or Bruni, sometimes called Borneo Proper, over which the Dutch do not claim jurisdiction. Its chief town is Bruni or Borneo, on the river of the same name, a place of considerable trade, principally with Singapore, and the residence of the sultan. In former times, the Kingdom of Borneo appears to have extended over the whole island and a part of the Philippines, and its monarchs are said to have been of Chinese origin. The Portuguese, who visited Borneo as early as 1518, were first allowed to settle at Banjermassing in 1690, from which, however, they were soon expelled. The Dutch alone succeeded in concluding a commercial treaty with the Prince of Banjermassing, and in 1643 erected a fort and a factory at the village of Tatis; a second, in 1778, at Pontianak, and several others subsequently. In 1702 and 1774 the British attempted to form settlements in Borneo, but without success. There is now, however, a state under English rule (though not under the British crown) on the W. coast of the island, namely, Sarawak, founded by Sir James Brooke, while Labuan, an island off the N.W. coast, is a British colony. In 1857 an insurrection of the Chinese, accompanied with great atrocities, broke out in the British settlement of Sarawak, but was promptly suppressed by Sir James Brooke, with the assistance of the Dyaks and Malays.

BORNHOLM, a Danish island in the Baltic Sea, nearly surrounded with rocks; lon. 15° E.; lat. 55° 10′ N.; pop. 29,300; about 24 miles long, and 16 broad. It is stony but fertile; yields oats and butter; has excellent pastures; and also mines of coal, marble quarries, and fisheries. The island has long been famous for its rock-crystals.

BORNOU, a kingdom of Central Africa, lying between 10° and 15° N. lat., and 12° and 16° 30′ E. lon., is bounded N. by Kanem and the Desert, E. by Lake Tchad, S. by Mandara, and W. by Soudan. From March to July the heat is extreme, the thermometer rising to 107°, and rarely falling below 86° Fahr.: during this time scorching winds from the S. prevail. As in other tropical countries, the seasons are divided into the dry and rainy: the latter continues from March to October, when the air becomes milder and fresher. The country is populous, containing thirteen principal towns. These are generally large and well built, with walls 40 feet high, and about 20 feet thick. The houses consist of several courtyards, with apartments for slaves, habitations for the different wives, and several turrets con-

nected by terraces, forming the apartments of the owner. The Bornou people, or Kanowry, have negro features; they are peaceable and quiet, but cowardly, and addicted to pilfering. The government is an absolute monarchy, and the king can, at any time, muster a well-equipped army of 15,000 or 20,000 men, mostly cavalry, armed with sabre, pike, and bow. The spearmen from Kanem, on the N. side of Lake Tchad, constitute a favourite body. The chiefs wear jackets of chain armour, cuirasses, or coats of mail. Indian-corn, cotton, and indigo, are the most valuable productions of the soil. Very few fruits or vegetables are raised, and agriculture is in a wretched state. The domestic animals are asses, camels, horses, dogs, sheep, goats, cows, and innumerable herds of oxen. Lions, panthers, leopards, hyenas, jackals, elephants (in herds of 50 to 400), and buffaloes crowd the forests. The crocodile and hippopotamus are considered a luxury. The ostrich, pelican, crane, and guinea-fowl abound. Civet cats are also numerous, and form the source of considerable traffic. The air is filled with locusts, which are devoured by the natives, both roasted and boiled, and formed into balls of a sort of paste. The mineral productions are unimportant. The principal return which the Moorish merchants obtain for their goods is slaves. The currency of the country consists of strips of cotton, about 3 inches wide and 1 yard long, called *gubbuk*.

BORODINO, BATTLE OF (called by the French *battle of the Moskwa*), gained by Napoleon, September 7, 1812, over the Russians under Kutusoff, who had taken the command August 29. The Russian commander took his position, September 1, at Borodino, with the purpose of defending Moscow against the advancing enemy. The Russians occupied a gentle rising on the left bank of the Kaluga, from the confluence of that river with the Moskwa to the wood through which the Kaluga road passes: their right wing was covered by the village of Borodino, situated on a height on the left bank of the Kaluga: 2000 paces to the left, in the rear, was a large redoubt. The left rested on a wood at the village of Seminovska, and was covered by works thrown up in front, and connected with the centre by a redoubt. The centre was covered by a ruined village. Works were also thrown up to cover different parts of the position. Barclay de Tolly commanded on the right, Bennigsen in the centre, and Bagration on the left. On the 5th Napoleon, having reconnoitred the Russian position, took possession of the redoubt in front of the left wing, previous to a general attack. The attack began early in the morning of the 7th. The French, after making an impression with their artillery and musketry, marched forward to a simultaneous attack on particular points. Success was most doubtful in the centre, where the Russians at one time recovered the great battery, after it had fallen into the hands of the French, and drove them back with great slaughter; but the failure of the Russian left enabled the enemy to throw a mass of force upon the point, which could not be withstood. The French had first got possession of the batteries by eight o'clock, but the fighting continued till late in the afternoon. The Russians retreated in good order, and without loss, no pursuit taking place. The French force amounted to about 150,000 men; the Russian was somewhat less; 50,000 dead and dying covered the field. The Russians acknowledged a loss of 25,000 men, among whom was Bagration. Murat, Ney, and Eugène Beauharnais distinguished themselves. See RUSSIA—History.

BORON. See BORACIC ACID.

BOROUGH, originally a fortified town. In England the term was early restricted to those towns which sent burgesses to Parliament. This burden, as it was once considered, was probably imposed on the largest and wealthiest towns, or on those which had placed themselves under the protection of some baron. Up to the reform act of 1832 many places formerly populous, and entitled to be represented, though reduced to not more than two or three houses, continued to retain their original privilege. These were called *rotten boroughs*. (See Parliament in art. BRITAIN.) The term borough is also applied to a corporate town, though it may not send a member or members to Parliament, and in this way boroughs are divided into parliamentary and municipal boroughs. The qualifications for voters in both classes of boroughs are the same. In all boroughs a mayor is chosen annually, and a certain number of aldermen and councillors periodically. The burgesses, that is, those entitled to vote, elect the councillors, whose number depends upon the number of wards into which the borough is divided; the councillors elect the mayor and aldermen. The mayor, aldermen, and councillors together form the council. The council manage the property of the borough, impose rates for public purposes, pass bye-laws for the good government of the borough, for the prevention of nuisances, &c. For the Scotch boroughs, or rather *burghs*, see BURGH.

BORROMEI ISLANDS (*Isole dei Conigli*, on account of the many rabbits there), four small islands in Lago Maggiore, in Italy. The islands have their name from the family of Borromeo, which for centuries was in possession of the richest estates in the vicinity of the Lago Maggiore. Vitelliano Borromeo in 1671 caused garden-soil to be spread over three naked rocks in this lake and terraces to be walled up. Thus arose the Isola Bella, Isola Madre, L'Isolino, and Isola dei Pescatori, the two first famous for their beautiful garden-grounds. The Isola Madre, abounding in pheasants, lies in the middle of the lake. It consists of seven terraces, with a kitchen-garden, cypresses, laurels, chestnuts, and myrtles. The Isola Bella is loaded with artificial ornament. It contains a handsome palace of four stories, with gardens adjoining, which are laid out in the French taste upon ten terraces rising above each other, and narrowing in proportion to their elevation. The whole has the appearance of a truncated pyramid, on the top of which stands a colossal unicorn, the armorial ensign of the Borromei. Orange, citron, and lemon trees, united by fine hedges, or forming arbours, breathe their fragrance; lofty laurels form a little grove; myrtles and cypresses are to be seen, together with pomegranate-trees, the fruit of which ripens here, for the mountains which crown the lake serve as a shelter against the cold winds. The climate of the Isola Madre, however, is milder than that of the Isola Bella. In the latter, the orange and citron trees, &c., must be secured in winter by boards laid over them, and in extreme cold by applying charcoal pans underneath.

BORROMEO, CARLO, COUNT, a celebrated Romish saint and cardinal, was born Oct. 2, 1538, at Arona, on Lago Maggiore, the family seat of his virtuous and pious parents; became, at the age of twelve, a commendatory abbot; studied the law at Pavia; was in 1559 made doctor, and in 1560 was successively appointed by his uncle Pius IV. apostolical prothonotary, referendary, cardinal, and Archbishop of Milan. As legate over Romagna, the March of Ancona and Bologna, he had a great share in the civil government: as protector of Portugal, of the Netherlands, of Switzerland, of the Franciscans, Carmelites, and of the Knights of Malta, he administered several important branches of the spiritual government of the pope, who created him his grand peni-

tentiary, and did nothing of importance without his advice. The re-opening and the results of the Council of Trent, so advantageous to the papal authority, were chiefly effected by the great influence of Borromeo, which was felt during the whole sitting of the council. He did much for the embellishment of the papal buildings, employing even his own fortune for that purpose, and established many good institutions as Archbishop of Milan; improved the discipline of the clergy, founded schools, seminaries, a regular order of secular divines, libraries, hospitals, and was indefatigable in doing good. During the pestilence which raged in Milan in 1576 he distinguished himself by his heroic devotion to his flock. As soon as the scourge appeared in the city, he hastened from a distant part of his diocese, where he was making a pastoral visitation, and spent all his energies in giving bodily aid and spiritual consolation to the plague-stricken inhabitants. All his virtues, however, could not save him from persecution and calumny: he was even severely attacked by the government, but no charge could be proved against him. He died Nov. 3, 1584, at the age of forty-six, exhausted by mental sufferings, the accusations of his enemies, and his monastical penances. Miracles were immediately said to be wrought at his tomb, and his canonization took place in 1610. Posterity will venerate the purity of his life, the energy and grandeur of his character, his exemplary administration, and the noble works which he accomplished; and, in spite of the bigotry which is to be attributed to the spirit of his age, and to his clerical relations, must acknowledge his truly Christian and apostolic character.

BORROMEO, Federigo, Count, nephew of the preceding, and equally distinguished for the sanctity of his life and the benevolence of his character, born at Milan in 1564; died in 1631. Like his uncle he was also cardinal and Archbishop of Milan. He is celebrated as the founder of the Ambrosian Library (which see). When Milan was again desolated by a pestilence in 1630, Federigo showed the same heroism and devotion as his uncle Carlo had done during that of 1576. In Manzoni's novel of I Promessi Sposi there is a graphic account both of this pestilence and of the labours of Federigo Borromeo to alleviate its miseries.

BORROWSTOUNNESS (popularly pronounced Bo'ness), a town in Linlithgowshire, Scotland, distant 17 miles W. from Edinburgh. It is situated on a low peninsula, washed by the Forth, and possesses two principal streets running from W. to E., which are narrow and irregular, and the houses old-fashioned and mean. Here are manufactories of vitriol, soap, and pottery, and in the vicinity are very extensive salt-works and collieries. Some business likewise takes place in ship-building, and a considerable trade is done in grain. The harbour is one of the best, as well as one of the oldest, in the Firth of Forth; in 1871 675 vessels of 71,573 tons entered in the foreign, colonial, and coasting trades, and 1508 of 162,556 tons cleared. The wall of Antoninus ran through the parish of Borrowstounness, and traces of it, called Graham's Dyke, are still visible on the E. bank of the Avon. Pop. of the town in 1861, 4561; in 1871, 4256.

BOS, Lambert, a profound philologist, was born at Workum, in Friesland, 1670, and died in 1717. He studied in the University at Franeker, where his rapid and brilliant progress obtained for him the Greek professorship in 1704. His Ellipses Græcæ is a standard work, and has been often printed. The edition of Schäfer (Leipzig, 1808) is the best. The Antiquitatum Græcarum Descriptio has also passed through numerous editions. His Vetus Testamentum ex Versione LXX. is highly esteemed. He was also the author of several other valuable philological works.

BOSA, a seaport, west coast of island of Sardinia, 18 miles S.S.E. of Alghero. It is built partly on the side of a hill, crowned by an old castle, and partly in an unhealthy plain. It has a cathedral and other churches, several monasteries, and a theological seminary, and is the residence of a bishop, suffragan to the Archbishop of Sassari. Wine, grain, and cheese are exported. Pop. 6500.

BOSCAN ALMOGAVER, Juan, a Spanish poet, born towards the close of the fifteenth century, at Barcelona; died about 1540. His parents, who belonged to the most ancient nobility, gave him a careful education. He followed the court of Charles V., and in 1526 was attached to it for some time in Grenada. His noble manners and character gained him the favour of the emperor. The education of the Duke of Alva was committed to him, and his instructions developed the great abilities which the duke afterwards displayed. After his marriage Boscan lived at Barcelona, occupied in publishing his works, together with those of his deceased friend Garcilaso, in which he was employed at the time of his death. Boscan was persuaded to attempt Italian measures in Spanish, by Antonio Navagero, an Italian scholar and ambassador of the republic of Venice at the court of the emperor. Thus he became the creator of the Spanish sonnet, and, with Garcilaso, first used the *terzine* in his poetical epistles and elegies. In general, he distinguished himself by introducing Italian forms into Spanish poetry, which met with great opposition and not less applause. The poems of Boscan are still esteemed. His other literary works, mostly translations, are forgotten.

BOSCAWEN, Hon. Edward, a British admiral of the last century, was born in 1711, and distinguished himself at Porto Bello and Cartagena, where he stormed a battery at the head of a part of his crew. In 1744 he was promoted to the *Dreadnought*, a 60-gun ship, in which he took the *Medea*. Three years afterwards, he signalized himself under Anson, at the battle of Cape Finisterre. Towards the close of this year he was raised to the rank of rear-admiral, and despatched with a squadron to the East Indies. Though he failed in an attempt on Pondicherry, he succeeded in making himself master of Madras, and returned to England, where he obtained a seat at the Admiralty Board. In 1755 he again sailed for North America, and in an action with a French squadron two ships of the line fell into his hands. In 1758, in conjunction with Lord Amherst, who commanded the land forces, he succeeded in reducing Louisbourg and Cape Breton, and the year following, having then the command in the Mediterranean, pursued the Toulon fleet, under De la Clue, through the Straits of Gibraltar, and coming up with it in Lagos Bay, completely defeated it, burning two ships and taking three. For these services he received the thanks of Parliament and £3000 a year, with the rank of general of marines, in 1760. He died in the following year. He sat in the Parliament of 1743 as member for Truro, in his native county.

BOSCH, Balthazar van den, a painter, born at Antwerp in 1675. The first work which brought him into notice was an equestrian picture of the Duke of Marlborough, executed in concert with Van Bloemen, who painted the horse. He was afterwards employed on a number of works, for which he is said to have received as high prices as Teniers or Ostade; and a short time before his death in 1715 was appointed director of the Academy of Antwerp.

BOSCOBEL, an extra-parochial liberty in Shropshire, a small place, but remarkable historically as

the hiding-place of Charles II. for some days after the battle of Worcester, Sept. 3, 1651. Boscobel House belonged at the time to a stanch royalist, and as it was judged a convenient place of retreat, Charles at once proceeded in that direction, and hid himself during the day in the thickest part of the wood. After making one attempt to escape from England through Wales, he was compelled to return again to his former hiding-place, and concealed himself among the branches of a pollard oak in Boscobel Wood, where it is related that he could actually see the men who were in pursuit of him, and hear their voices. The 'royal oak' which now stands at Boscobel, is said to have grown from an acorn of this very tree. An account of Charles's adventures after the battle of Worcester was published in 1662, with the title, Boscobel, or the Compleat History of his Sacred Majestie's most Miraculous Preservation after the Battle of Worcester. The author of this history is not known with certainty, but it is said to have been the work of Thomas Blount. Anthony à Wood, the author of Athenae Oxonienses, says of it that it is 'penned with great truth and fidelity.'

BOSCOVICH, ROGER JOSEPH, an astronomer and geometrician of distinguished eminence in the eighteenth century, was a native of Ragusa, in Dalmatia. He was educated among the Jesuits, and entering into their order, was appointed professor of mathematics in the Roman College, before he had entirely completed the course of his studies. He was employed by Pope Benedict XIV. in various undertakings, and in 1750 began the measurement of a degree of the meridian in the Ecclesiastical States, which operation occupied him for two years. He afterwards visited the Pontine Marsh, to give advice respecting the draining of it. He was then intrusted by the Republic of Lucca with the defence of its interests, in a dispute about boundaries with the government of Tuscany. This affair obliged him to go to Vienna, and having terminated it with success, he visited Paris and London. He was elected a Fellow of the Royal Society, and dedicated to this body a Latin poem on eclipses. Returning to Italy, he was appointed mathematical professor in the University of Pavia; whence, in 1770, he removed to Milan, and there erected the celebrated observatory at the College of Brera. On the suppression of the order of Jesuits, he accepted an invitation to France from Louis XV., who gave him a pension of 8000 livres, with the office of director of optics for the navy. This appointment induced him to pay particular attention to that part of optical science which treats of the theory of achromatic telescopes, on which subject he wrote a treatise of considerable extent. He was obliged to leave Paris in 1783, on account of ill health, when he retired to Milan, where he died, Feb. 12, 1787. An edition of the works of Father Boscovich was published by himself at Bassano, in five vols. 4to, 1785. His Theoria Philosophiæ Naturalis reducta ad Unicam Legem Virium in Natura Existentium, first published in 1758, is a curious production, containing speculations of which Dr. Priestley availed himself in his writings in favour of materialism.

BOSHMEN, or BOSJESMEN. See BUSHMEN and HOTTENTOTS.

BOSNA-SERAÏ, SERAÏ, or SERAJEVO (ancient, *Tiberiopolis*), a city, Turkey in Europe, capital of the province of Bosnia, situated on the Migliazza, which is here crossed by a handsome stone bridge, 570 miles W.N.W. of Constantinople. It is well built, and although most of the houses are of wood, has a gay and pleasant appearance, from the number of steeples and minarets with which it is embellished. It contains a *serai* or palace, built by Mohammed II., to which the city owes its name; 100 mosques, great and small; four churches, three monasteries, two large bazaars, several schools, baths, and charitable institutions. It was formerly surrounded with walls, but these are now completely decayed; and its only remaining defence is a citadel, built on a rocky height at a short distance E. from the town, mounted with cannon. Bosna is the chief mart in the province, the centre of the commercial relations between Turkey, Dalmatia, Croatia, and South Germany; and has, in consequence, a considerable trade. The people are industrious, and manufacture arms and utensils of copper for the Turkish market; ironware, woollen and worsted stuffs, morocco leather, horse-hair bags (for holding rice), cottons, &c. There are also several tanneries in the city, and at a short distance from it several important iron mines; and on a plain which stretches to the W. the baths of Serajevesko. Pop. estimated at 46,000.

BOSNIA, a Turkish province, with the title of a kingdom, which comprehends, besides the ancient Bosnia, part of Croatia, between the rivers Unna and Verbas, a tract of Dalmatia and Herzogovina, and is bounded N. by the Austrian Military Frontiers, W. by Croatia, S.W. by Dalmatia and the Adriatic Sea, S. by Montenegro, and E. by Servia. Bosnia contains from 23,000 to 24,000 square miles (of which Bosnia Proper occupies 16,000), with over 1,000,000 inhabitants, mostly of Slavonian origin, and comprising Bosniaks, Servians, Morlaks, and Croats, besides Turks, Greeks, Jews, Gipsies, &c. The Bosniaks are the most numerous. They are partly Mohammedans, partly Roman and Greek Catholics. The Servians and Croats are next in point of number. The country is level towards the N.; in the S., mountainous and woody. Its chief rivers are the Save, the Verbas, the Bosna, Rama, and Drina. Bosnia contains fertile fields, orchards, and vineyards: the breed of cattle is excellent, and the mountains furnish good iron, of which a great part is manufactured in the country into guns and blades. The other articles manufactured are leather, morocco, and coarse woollen cloths. In the twelfth and thirteenth centuries Bosnia belonged to Hungary. In 1339 it fell into the hands of Stephen, king of Servia. After his death it remained independent, and the Ban Twartko took the title of king in 1370. In 1401 it became tributary to the Turks, and since 1463 has been a Turkish province. It is divided into the southern and northern parts, or Upper and Lower Bosnia. The former is called sometimes *Herzogovina*, or the *duchy of Saba*, because the Emperor Frederick III. bestowed the title of duke on the ruler of this district in 1440. The capital is Bosna-Seraï (which see); Zvornik, Banyaluka, Mostar, and Travnik are also important places. The Bosniaks are boorish in their manners and uncourteous towards strangers, but industrious and temperate. The women, like the men, are well and strongly made, and mostly good-looking. They are fond of hunting and fishing, and engage to some extent in agriculture, cattle-rearing, and the caravan trade. Servian is the language generally spoken. Bosnia has often attempted to throw off the Turkish yoke; but since the reforms introduced about 1851, these attempts have ceased.

BOSPORUS (that is, *Ox-ford*), the strait joining the Black Sea with the Propontis or Sea of Marmora, called also the Strait of Constantinople. It received the former name, either because Io, after being metamorphosed into a cow, passed over at this place, or because the strait is so narrow that an ox can swim across. When other straits were afterwards called by the same name, this was called *Bosporus Thracicus*. Over this channel (5 stadia, about 3033 feet wide) Darius constructed a bridge of boats, on

his expedition against the Scythians. *Bosporus Cimmericus* was the name given by the ancients to the strait that leads from the Black Sea into the Sea of Azov. The Italians, who formerly traded in these regions, called it *Bocca di S. Giovanni*, or *Stretto di Caffa*. There was also anciently a kingdom of the name of Bosporus, so called from this strait, on both sides of which it was situated. In Panticapæum (at present *Kertch*, which see), a Milesian colony in the Tauric Chersonese, the Archæanaktidæ established this kingdom B.C. 479, and reigned till B.C. 437. Spartacus was the first king. Under his successor, Satyrus, the kingdom was extended to the coast of Asia, and his son Leucon acquired Theodosia B.C. 300. He improved the commerce of the country (in particular by the exportation of corn to Athens, also of fishes, fur, skins, bees'-wax, and slaves). From him his descendants were called *Leuconidæ*. Leucanor became tributary to the Scythians B.C. 290, and the tribute was finally so oppressive that Parisades, the last of the Leuconidæ, preferred to submit to Mithridates, the king of Pontus, who vanquished the Scythians under Scilurus B.C. 116, and made his son King of Bosporus. The latter killed himself. At the death of Mithridates the Romans gave the country, B.C. 64, to his second son, Pharnaces, who was afterwards murdered. The Romans placed different princes successively upon the throne, who all pretended to be descendants of Mithridates. When this family became extinct, A.D. 259, the Sarmatians took possession of the kingdom, from whom it was taken by the Chersonesians in 344. The Tauric Chersonese then belonged to the Eastern Empire, till it was seized by the Chazars, and afterwards by the Tartars, under the Mongol princes. See TAURIDA.

BOSSUET, JACQUES BÉNIGNE, Bishop of Meaux, an illustrious French preacher, was born at Dijon in 1627, and early sent to the college of the Jesuits there. By chance he got possession of a Latin Bible, which made an indelible impression upon him. At the age of fifteen he was sent to Paris, where he entered the College of Navarre, the president of which, Nicholas Cornet, took pleasure in forming his mind. Bossuet, under the direction of this worthy teacher, studied Greek and the Holy Scriptures, read the ancient classics, and investigated the Cartesian philosophy. He was made Doctor of the Sorbonne and canon in Metz. Here he edified his hearers by his preaching and example; was commissioned by his bishop to refute the catechism of the Protestant minister Paul Ferry, and did it in such a way that even his antagonists were obliged to respect him. The queen-mother (Anne of Austria) was induced, by this work, to employ Bossuet in the conversion of the Protestants in the diocese of Metz. This business often called him to Paris, where his sermons met with great approbation. The sermon which he delivered in 1668, on the occasion of Marshal Turenne's joining the Catholic Church, procured him the bishopric of Condom. In 1670 the king charged him with the education of the dauphin. In consequence of this appointment he resigned his bishopric in 1671, because he thought it inconsistent with his duty to retain it during a continual absence from his diocese. At this time he delivered his sermon at the funeral of Madame the Duchess of Orleans, a princess who, in the midst of a brilliant court, of which she was the ornament, died suddenly in the bloom of youth. His last sermon of this kind (that at the tomb of the great Condé) is considered as a master-piece. The manly vigour which characterized his orations is seen also in the Discours sur l'Histoire Universelle, designed for the instruction of his royal pupil. The care which he took of the education of this prince was rewarded in 1680 by the office of the first almoner of the dauphin; in 1681 by the bishopric of Meaux; in 1697 he obtained the dignity of a councillor of state, and a year afterwards that of the first almoner of the Duchess of Burgundy. His practice and his doctrine were equally severe. All his time was divided between his studies and the execution of his official duties; he seldom allowed himself any recreation. The last years of his life he passed among his flock, in the midst of whom he died in 1704. The learned Benedictines of the brotherhood of St. Maur published a complete edition of the works of Bossuet in forty-three vols. 8vo (Versailles, 1815–19). Bossuet was unrivalled as a pulpit orator, and greatly distinguished for his strength and acumen as a controversialist. The French Academy consider him among their most renowned members. He has described his own life at length. (For his dispute with the Archbishop of Cambray, Fenelon, see FÉNÉLON and QUIETISM).

BOSSUT, CHARLES, an eminent mathematician, born at Tartaras, department Saone-et-Loire, in 1730, was educated at the Jesuit College, Lyons, and having met with the Éloges of Fontenelle, was smitten with so eager a desire to imitate the distinguished individuals therein described, that he wrote Fontenelle himself on the subject. That veteran, now ninety years of age, not only answered the letter, but expressed such an interest in the future progress of his young correspondent, that Bossut repaired to Paris, and was introduced by Fontenelle to Clairaut and D'Alembert, the latter of whom he appears to have particularly admired and studied to imitate. In 1752 he was appointed professor of mathematics to the school of Mezières, and held it for sixteen years, during which he gained several prizes offered by the Academy of Sciences. He afterwards was admitted a member of that body, and was at the same time appointed examiner of candidates for the artillery and engineers. At the revolution he was deprived of all his appointments, and afterwards lived in retirement till his death in 1814. His *éloge* was pronounced in the Academy by Delambre. His most important works are a Course of Mathematics, which was long in repute as a text-book; a Treatise on Hydrodynamics, in which theory and practice are happily combined; the Introductory Discourse to Mathematics, and various other articles in the Encyclopédie; and a History of Mathematics. He also published a complete edition of the works of Pascal.

BOSTON (anciently *Botolph's Town*), a parl. and mun. borough, port, and market town in Lincolnshire, 100 miles N. from London. It is nearly surrounded by fens, and is situated on the Witham, which is navigable, and forms a port, well frequented, and much assisted by navigable canals. It has a flourishing trade with the Baltic for hemp, tar, timber, &c. In former periods it stood high as a commercial town. The church is a handsome structure, on the tower of which is placed a lantern, which serves as a beacon to seamen. The town has been much improved of late years by the erection of new houses, by the deepening of the river, the enlargement of the harbour, and the erection of a handsome bridge across the river, consisting of one arch 86 feet in the span. The market-place, which is spacious, is ornamented by a handsome cross, and in the town-hall are commodious assembly-rooms. Like most towns near the sea, it is but indifferently supplied with water; that acquired from the wells, with a few exceptions, being somewhat brackish. The early history of Boston is obscure; but it is believed that the Romans built a fort at the mouth of the Witham; and it is certain that the word Boston is a corruption of Botolph's town, so called from a Saxon of that name who built an abbey here. Pop. of mun. bor. in 1861, 14,712; of parl. bor., 17,893; in 1871, 15,576 and 18,289

respectively. It has direct railway communication with London.

BOSTON, the capital of Massachusetts, and the largest city in New England, lies 210 miles N.E. from New York, 300 S.S.E. Montreal, 300 N.E. Philadelphia, 432 N. Washington; lon. 71° 40′ 9″ W.; lat. 42° 21′ 23″ N. Pop. in 1800, 24,937; in 1860, 177,812; in 1870, 250,526; It is situated at the bottom of Massachusetts Bay, at the mouth of Charles River. It stands principally on a small peninsula of elevated ground, 2¾ miles in length, and 1 in breadth, and is connected with the continent by a narrow neck of land, and by seven bridges. It is divided into five districts: Boston, South Boston, East Boston, Highland, and Dorchester. It has a capacious harbour, of sufficient depth of water for the largest ships of war to enter safely and lie at anchor, protected from storms by a great number of islands, on several of which are fortifications. The bridges, with few exceptions, are of wood. That which leads from Boston to Cambridge is 3483 feet in length, and is supported by 180 piers. The Western Avenue, so called, leading across the bay, from the western part of the city to Roxbury, is 8000 feet in length, and is formed of solid earth, supported on each side by walls of stone. It serves the double purpose of a bridge and a dam, by means of which and a cross dam two large basins are formed, one of which is filled at every flood-tide, and the other is emptied at every ebb, whereby a perpetual water-power is created for driving mills and machinery. This dam was built at a cost exceeding £135,000. The streets are mostly narrow and irregular, and some of them are crooked, in the older parts of the town, but in the newer part are many fine spacious streets. Great improvements have been made, within a few years, in the general appearance of the city, by the widening and repaving of streets, the erection of new and elegant buildings, and the embellishment of the public grounds. The principal public square is the Common, which with the Mall, a gravelled walk which surrounds it, covers a surface of about 50 acres. It is a handsome piece of ground, has a sloping and undulating surface, is partly shaded with elms, and is surrounded by some of the most elegant buildings in the city. The wharfs are, in general, spacious, and afford ample accommodation to shipping, and storehouses for merchandise. Long Wharf is 1800 feet in length; Central Wharf, 1380 feet long and 150 wide. The wharfs and many of the streets have been made by raising the ground formerly covered by the tide. A great part of the buildings are of brick, four stories in height; but many of them are of granite. The principal public buildings are the state-house, which is of brick, situated on the highest part of the city, and commanding a view of the country and bay for many miles round; the county court-house, which is of stone; Faneuil Hall, so called from Peter Faneuil, a citizen of Boston, who presented the hall to the city in 1742, in which town-meetings and public assemblies for political discussions are held, and famous historically as the place in which the Americans were roused by their orators to resistance against the British, hence sometimes called the Cradle of Liberty; the city-hall or old state-house, now used as public offices; the splendid granite custom-house, of Grecian architecture; the merchants' exchange, the institute for the blind, the Massachusetts general hospital, and the Faneuil-hall market; more than 130 places of worship, many of them handsome and imposing structures, among which the new Catholic Cathedral is one of the most splendid buildings of the kind in the United States; numerous school-houses, several of them regarded as models of their kind; a house of industry, a house of correction, a county jail, a music hall containing an organ remarkable for the beauty of its tone, and six theatres.

There are three grades of public schools—primary, grammar, and high schools. There were in 1869, 305 primary, 27 grammar, and 4 high schools. Besides these there were 10 evening schools for adult persons. The expense of supporting the schools in the same year was $1,013,240 (£202,648). The schools are managed by a committee, consisting of the mayor, the president of the common council, and six persons from each ward. The principal literary institution in the vicinity, Harvard University, founded in 1638, is situated at Cambridge, 3 miles from the city. The library has 184,000 vols. The medical branch of this institution is established in Boston, where the professors reside. The Boston Athenæum has two large buildings; one containing a library, and the other a picture-gallery, a hall for public lectures, and other rooms for scientific purposes. The library consists of about 100,000 vols. There are many literary, scientific, and charitable societies in Boston. Among the former are the American Academy of Arts and Sciences, the Historical Society, the Massachusetts Medical Society, the Mechanics' Institution, under whose patronage courses of lectures for mechanics are delivered annually without charge, and the Female College. Among the latter are the Humane Society; the Boston Dispensary, by which the poor are furnished with medical attendance and medicine free of expense; the female asylum, for the maintenance of female orphans; the boys' asylum, and several others. A prominent feature in Boston is the number of good libraries. Besides those already mentioned, there is the Public Library, founded in 1852, which already contains 160,000 vols.; the State Library, with 29,000 vols.; and others.

The pursuits of the inhabitants are in a great measure mercantile. They carry on an extensive foreign trade, and own many ships, which are employed not only in the importing, exporting, and coasting trade, but in trade between foreign markets. They are also largely engaged in the fisheries. Boston is the third commercial town in the United States. The number of vessels entered from foreign ports in 1870 was 3115; the number cleared, 2148; the number entered coastwise, 6650; cleared, 5602. Many kinds of manufactures are carried on here, one of the principal being that of boots and shoes. The capitalists of Boston are also the principal proprietors in the joint-stock manufacturing companies established in Lowell, Waltham, and other towns in Massachusetts and some of the neighbouring states.

Although Boston may be regarded as the cradle of the American newspaper press, since the first American newspaper, the Newsletter, was set up here in 1704, the newspapers of Boston do not at present occupy a very high rank among those of the United States. On the other hand the book-trade of the city is important, and some of the periodicals are conducted with great ability, and are extensively circulated. Among these are the North American Review, and several other important serials.

Boston was founded in 1630 by some English emigrants, and was called by them at first Trimountain, from the three heights on which the first settlements were made. It received its present name in honour of an English clergyman, John Cotton, who was a native of Boston in Lincolnshire, and emigrated to this city. In the American War of Independence, Boston, which had already placed itself among the foremost in resisting the mother country, played an important part. The first decisive steps were taken here; and in the neighbourhood the battle of Bunker's Hill was fought July 17, 1755. Boston also took

a prominent position in the movement which was directed towards the abolition of slavery. On the evening of the 10th of November, 1872, a great fire broke out in the city, which raged for about twenty hours, and laid 60 or 70 acres of the city in ashes. As the burned district was in the business quarter, there were but few dwelling-houses or important public buildings consumed. Among the distinguished men to whom Boston has given birth may be mentioned Benjamin Franklin, who was born here Jan. 17, 1706.

BOSTON, THOMAS, a popular Scottish divine and doctrinal writer, was born at the town of Dunse in 1676, and received his education at the University of Edinburgh. In 1699 he was ordained minister of the parish of Simprin, and in 1707 he became pastor of Ettrick, where he died in 1732. His most esteemed work is entitled Human Nature in its Fourfold State, which first appeared in 1720, and has gone through numerous editions. He also wrote a treatise in Latin, on Hebrew accents, entitled Tractatus Stigmologicus Hebræo-Biblicus, &c. A collection of his whole works was published in 1768, folio, with a memoir of his life written by himself.

BOSWELL, JAMES, the friend and biographer of Johnson, was the eldest son of one of the supreme judges of Scotland, styled Lord Auchinleck, from the name of his estate in Ayrshire. He was born at Edinburgh in 1740, and studied in his native city, in Glasgow, and in the Dutch University of Utrecht. He afterwards resided several times in London, and cultivated the acquaintance of the most distinguished men of his time. Here he became acquainted with Johnson—a circumstance which he himself calls the most important event of his life. He afterwards visited Voltaire at Ferney, Rousseau at Neufchatel, and Paoli in Corsica, with whom he became intimate. He then returned by the way of Paris to Scotland, and devoted himself to the bar. In 1768, when Corsica attracted so much attention, he published his valuable account of Corsica, with Memoirs of Paoli. At a later period he settled at London, where he lived in the closest intimacy with Johnson. In 1773 he accompanied him on a tour to the Scottish Highlands and Hebrides, and published an account of the excursion after their return. After the death of Johnson he became his biographer. The minuteness and accuracy of his account, and the store of literary anecdote which it contains, render this work very valuable. It is, in short, the most complete, the most instructive, and the most entertaining piece of biography ever presented to the world. It was published in two vols. 4to, in 1791, and has been repeatedly reprinted. Boswell died in 1795. He left two sons, Alexander and James.—The elder of these, ALEXANDER BOSWELL, was born in 1775, and succeeded his father in the possession of the family estate. He was distinguished as a spirited and amiable country gentleman, and also as a literary antiquary of no inconsiderable erudition. Perhaps his taste in the latter capacity was greatly fostered by the possession of an excellent collection of old manuscripts and books, which was gathered together by his ancestors, and has acquired the well-known title of the 'AUCHINLECK LIBRARY.' From the stores of this collection, in 1804, Sir Walter Scott published the romance of Sir Tristrem. Besides this invaluable present to the literary world, the Auchinleck Library furnished in 1812 the black-letter original of a disputation held between John Knox and Quentin Kennedy at Maybole in 1562, which was printed at the time by Knox himself, but had latterly become so scarce that hardly another copy, besides that in the Auchinleck Library, was known to exist. At an early period of his life some of his poetical *jeux d'esprit* occasionally made a slight turmoil in that circle of Scottish society in which he moved. In 1803 he published a small volume entitled Songs chiefly in the Scottish Dialect, some of which are still popular among his countrymen. In 1816 appeared a poetical tale, somewhat like Burns' Tam o' Shanter, entitled Skeldon Haughs or the Sow is Flitted, being founded on a traditionary story regarding an Ayrshire feud of the fifteenth century. In 1821 Mr. Boswell was honoured with a baronetcy of Great Britain. On the 26th of March in the following year he met his death in a duel with a Mr. Stuart, against whom he had made some severe attacks in a political journal.—JAMES BOSWELL, the second son of the biographer of Johnson, born in 1779, died in 1822, is known as the editor of an improved edition of Malone's Shakspeare, also as the author of Memoirs of Mr. Malone, and an essay defending that commentator against the attacks which had been made on his literary reputation.

BOSWORTH, a small town in the county of Leicester, England, about 3 miles from which is Bosworth Field, where was fought, in 1485, the memorable battle between Richard III. and the Earl of Richmond, afterwards Henry VII. This battle, in which Richard lost his life, put a period to the long and bloody Wars of the Roses, between the houses of York and Lancaster. Pop. 1149.

BOTANIC GARDENS, establishments in which plants from all climates, and all parts of the world, are cultivated in the open air, in green-houses and hot-houses. The object of such an establishment is partly information and the improvement of science, partly pleasure and luxury. Theophrastus seems to have instituted the first botanical garden. He bequeathed it to his scholars. Attalus Philometor, king of Pergamus, and Mithridates Eupator of Pontus, vied with each other in the establishment of gardens, where they cultivated poisons and antidotes. Pliny mentions a botanical garden which was laid out in Italy by Antonius Castor, son-in-law of King Deiotarus. In the middle ages Charlemagne exerted a favourable influence by establishing gardens near the imperial palaces and castles, specifying even the single shrubs which were to be planted. In the beginning of the fourteenth century Matthæus Sylvaticus, at Salerno, founded the first *botanic garden*, properly so called. The Republic of Venice soon afterwards, in 1333, instituted a public medical garden, and had the plants painted by Amadei. The paintings are still preserved. After the time of the revival of learning, the first botanical gardens, which contained, however, for the greater part, merely medicinal plants, were laid out in Italy. Duke Alfonso of Este was the founder of an excellent institution of this kind in Ferrara; then followed the gardens in Padua, Pisa, and Pavia. Montpellier in France first imitated his example. The academical garden in Leyden was instituted in 1577; that of Paris in 1633; and about the same time the first botanic gardens in Germany and England were founded. At present the largest and most renowned in Germany are—the Imperial Austrian, at Schönbrunn; the Royal Prussian, near Berlin; that of Weimar, in Belvidere; that of the Grand-duke of Baden, at Schwetzingen; and the Royal Hanoverian, in Herrnhausen. In Great Britain the Royal Gardens at Kew, which under the superintendence of Sir William and Dr. Hooker have been greatly extended and improved, and are now perhaps the finest establishment of the kind in the world; the Chelsea Garden, founded for the London apothecaries; and that at Liverpool, are the most celebrated scientific institutions, to say nothing of the extensive gardens where plants are raised for sale. In France the

Royal Garden in Paris, called the Jardin des Plantes (Garden of Plants), with its museums, is the principal. It was founded by Louis XIII. in 1635. Formerly that of Malmaison, founded by the Empress Josephine, was very famous. In Italy, the garden of the university at Turin is perhaps the best; in Spain, the Royal Garden at Madrid; in Denmark, the garden of the university at Copenhagen. The principal botanic gardens in America are at New York, Philadelphia, and Cambridge. In Asia, the garden of the East India Company at Calcutta is the most important.—At present almost all universities and learned academies, as well as most large towns, have botanic gardens.

BOTANY, the common designation of the science which treats of the vegetable kingdom, is a Greek term, from *botanē*, an herb or grass. A designation more in accordance with the names of the other physical sciences would be *Phytology*, from the two Greek words *phyton*, a plant, and *logos*, a discourse. PHYTOLOGY, or the history of plants, in its general range embraces—1, the structure and composition of all vegetable bodies; 2, the physiology or laws which regulate the living plant; 3, the classification of the various specific forms of plants; 4, the geographical relations of plants; and, 5, fossil botany, or the history of extinct species. A plant or vegetable forms the first and simplest stage of an organized being—it is a precursor of the more highly endowed animal, and forms an intermediate link between inorganic matter and sensitive existence. A plant may be defined as a living organism, non-sensitive—generally rooted or fixed in the soil, though not always—possessing a certain amount of motion from the stimulus of mechanical causes, but not the muscular self-produced motion of animals. A plant, in opposition to mineral or inorganic bodies, may be considered as a living centre or individual, actuated by special vital laws, which empower it to take in external inorganic matters and assimilate these into its substance, whereby peculiar organic compounds are produced from simple elements.

A plant, then, in the first instance, performs what no animal can do—it directly assimilates simple inorganic matter into organic compounds, and thus is the preparer of the proper food of all animals. We thus find that the component parts of plants and animals are exactly the same; that is, that the same elementary substances enter into the formation of both, though there are considerable modifications in the manner in which the combinations are made in the plant and in the animal. There are in all nearly twenty simple inorganic substances found entering into the composition of plants, but only about the half of these may be said to be the essential and general component parts of vegetables. Nearly one-half of the vegetable structure consists of carbon, either in a fixed solid form or combined with gases. It forms, as it were, the skeleton or basis of the whole structure, and by carefully charring or burning off the more volatile parts a solid cellular framework of charcoal will remain. The other solid parts of plants consist of the earths and alkalies, a minute portion of sulphur and phosphorus, and four gases, either combined with solid bases or forming aqueous fluids.

Hydrogen, oxygen, nitrogen, and carbon in various proportional combinations form the great mass of vegetable products, such as woody fibre, starch, sugar, gum, oil, gluten. Sulphur and phosphorus are found in most plants, entering into the composition of albumen, casein, and essential oils. Chlorine, iodine, and bromine enter into the composition of marine plants. Silica forms the outer covering of the bamboo, and of reeds and grain plants. Potash is an ingredient in all land plants, and soda chiefly in marine vegetables. Lime is common in plants, but alumina is only found in minute quantity; iron is also common, but the other metals very rare. It is said that a trace of copper is found in coffee, and gold is reported to exist in the lime-tree.

LIST OF VEGETABLE ELEMENTS.

Organic Elements, forming Organic Compounds, and which are dissipated by Ignition.

1. Carbon.	3. Oxygen.
2. Hydrogen.	4. Nitrogen.

Inorganic Elements, entering partly into Organic Compounds, and partly forming Secretions, several of which remain in the Ashes of Plants.

5. Chlorine.	13. Soda.
6. Iodine.	14. Lime.
7. Bromine.	15. Magnesia.
8. Fluorine.	16. Alumina or clay earth.
9. Sulphur.	17. Iron.
10. Phosphorus.	18. Manganese.
11. Silex.	19. Copper.
12. Potash.	20. Gold (?).

Two or more of these substances combine to form vegetable products. The binary products are water, carbonic acid, oxalic acid, ammonia, &c.; the ternary products are starch, gum, sugar, oils; citric, malic, acetic, and fluoric acids, inulin; the quaternary, albumen or gluten, chlorophyll or the green-coloured matter of plants, tannin, caoutchouc, humus. It will thus be seen that the component parts of plants, and consequently their food, are derived from the air, the water, and the earthy soil; and accordingly the general structure of plants, at least of the more perfect ones, is so appropriate to their functions as to tell the history of their habits; and deriving their subsistence both from the juices of the soil and the gases of the atmosphere, we find them possessed of two systems of organs in harmony with each other. In a tree, one of the noblest of vegetable objects, we find a system of minutely ramified roots, porous and open, to drink up the moisture and the various dissolved substances of the soil, while an equally minutely ramified series of branches mount upwards, with thin, flat, porous leaves spread out to the heavens to catch the air and the vivifying influence of the sun. The intermediate stem or trunk, perforated by innumerable cells and tubes, not only affords a means of support and elevation, but forms the medium by which the juices ascend and descend in their secret and wonderful processes of elaboration. Such are the important offices of plants, too, in ministering to the existence of animals, that the surface of the earth teems with their green and variegated forms. There is scarcely any region so barren as to be without its peculiar vegetation, and neither rock nor mountain, swampy marsh nor arid sandy upland, without its appropriate plants. If there are not as many distinct species of plants existing as there are animals, the numerical amount of individual species of almost every plant far exceeds that of even the most prolific animals.

The *morphology* of plants embraces a view of their general structure and organs. These organs are subdivided into *nutritive*—those which are conducive to the growth and sustenance of the individual plants, as the roots, stem, leaves—and *reproductive*—those which are engaged in the development of similar forms to the parent plant, as the flowers and seeds.

All vegetable tissues and structures may be ultimately traced to a minute cell, a circular or oval bag, composed of an enveloping gelatinous membrane (*cellulose*), containing a fluid within it. One or more dark spots, called nuclei or cytoblasts, are also visible within some cells, and from these new cells

are formed. These cells generally are exceedingly minute, from $\frac{1}{1000}$ to $\frac{1}{10000}$ of an inch in diameter; in the more succulent plants, from $\frac{1}{30}$ to $\frac{1}{60}$ of a line in diameter. The free independent cells preserve a globular or oval form, but when combined and compressed they assume angular and compressed elongated shapes. A single cell, or two or three, may form a complete plant—as in the *Palmella* and *Protococcus nivalis* or red-snow plant; and these cells, dividing in the centre, and throwing off one-half, may thus multiply the species indefinitely. A simple aggregation of cells, where the circumference of the vesicles just meet without compression, is called cellular tissue, or *parenchyma*. This forms the structure of the lower divisions of the vegetable kingdom, as the algæ or sea-weeds and mushrooms. In these the growth or production of new cells is very rapid, especially in moist and warm temperatures. When the cells are more compressed, they form spiral vessels and hollow tubes of various kinds, which traverse the interior parts of the plant, and convey the fluids and gases necessary for its nourishment through the roots, stem, and leaves. When a succulent vegetable stem is cut across, these tubes are seen with a common magnifying glass. They are of various structure; the spiral tubes are formed of cellular bands coiled up like a screw; others are formed of annular rings, or of a series of bead-shaped and minutely-dotted vessels. Woody fibre is composed of a series of spindle-shaped tubes closely compacted, and overlapping each other—some, as in the fir tribe, punctuated at intervals by saucer-like disks. In the bark of some plants are long branching tubes, or *laticiferous* vessels which secrete a milky juice. In a section of a plant, open spaces, or lacunæ of irregular form and size, are observed, constituting the intercellular tissues. The tender and delicate cells and vessels of plants are protected by a general covering of bark, which consists of the outer *epidermis*, composed of thick and compact cellular tissue, and the inner *liber* or true bark. Hairs, setæ or bristles, spines, and glandular tubes have their origin in the bark, and this substance is also perforated at various intervals, especially in the leaves, by *stomata* or air-passages. The whole tissues and coverings of plants are also free to the transmission or absorption of water and aeriform gases. (See Pl. XVII. XVIII.)

The structure of the particular organs of plants varies according to the scale in which the plants stand in the order of the natural arrangement of the vegetable kingdom; and in the general description of organs reference will frequently be made to three great natural divisions, beginning at the lowest or simplest, and ascending to the more complicated. I. *Acrogenous* or cryptogamic plants, as fuci or sea-weeds, mushrooms, mosses, ferns, mostly composed of cellular tissues and porous vessels, and which propagate by simple sporules or bud-like germs without conspicuous flowers. II. *Endogenous plants*, with stems which increase by additions from the interior, composed chiefly of vascular bundles, with conspicuous flowers, and seeds with one lobe or cotyledon, hence termed *monocotyledons*, including lilies, grasses, palms, sugar-cane, bamboo. III. *Exogenous plants*, with a stem having central pith, medullary rays, and spiral and other vessels. The seeds have two or more cotyledons or lobes, hence the term *dicotyledonous*, as the bean, oak, elm, and numerous herbs and trees.

The Roots.—From the central axis of the embryo of a seed, the root in the process of germination is the first organ to appear, and it immediately begins to descend into the soil, while the *plumule* or rudimentary stem, springing from the upper part of the same central axis, ascends upwards into the air. At first both radicle and plumule consist entirely of cellular tissue, and in cellular plants the root always retains this structure, but in vascular plants other vessels are gradually added till the root assumes the structure of the stem, of which it may be considered a prolongation, only it has no tendency to form leaf-buds. The collum, or neck, is that portion where the root joins the stem. The root acquires woody fibre, but has no true pith or medullary centre. The main axis gives off branches or radicles, which become very minute and porous at the extremities, and frequently terminate in *spongioles*, or thick porous masses, which are reckoned the old radicles of the preceding year. The roots of monocotyledons, instead of proceeding directly from the central axis, spring out through a sheath by one side, as is seen in the oat, barley, and palm-tree. The roots of the common duck-weed (*Lemna minor*) are not fixed in the earth, but are suspended in the water, on which the plant floats. Some parasitical plants have aerial roots, which wave in the air and absorb moisture. The mangrove, banyan, and some other trees send out roots which form supports to the stem and branches, the upper part of these roots remaining above-ground. Roots are annual or more permanent according to the longevity of the plants. The office of the root is to absorb the juices of the soil, and convey these to the stem and leaves. The minute rootlets perform this office through the porous tissues of the bark, by which the whole root is covered. Roots are of various forms, as the fibrous root, the thick, fleshy, or tap root, as in the carrot; the bulbous or tuberous root, as the orchis; the moniliform or jointed root. A reference to Pl. XV. will explain the various forms of roots.

Articulate, when the root is jointed, as in Wood Sorrel (14).
Bulbs, underground buds. They may be scaly (7), coated (11), solid (2), lateral, double, compound, as in Lilium, Allium, &c.
Dentate, when fleshy-branched roots have tooth-like processes—Coral-rooted Ophrys (12).
Fibrous, when the root consists of a number of small fibres—Poa (1).
Fusiform, when spindle shaped, tapering gradually like the Carrot or Beet (4).
Granulate, forming small round bodies, as in *Saxifraga granulata* (6).
Horizontal, when lying horizontally on the ground, as in Polypodium (3).
Napiform, when the knobs are round, like the Common Turnip.
Palmate, hand-shaped, divided into three or more longish knobs—*Orchis latifolia*.
Præmorse, terminating abruptly, as if bitten off, as in Devil's Bit (10).
Ramose, when divided into many branches, as in most trees, &c.
Repent, creeping under the surface of the earth, and at intervals pushing up stems (5).
Squamose, when the bulb is covered with scales—White Lily (7).
Testiculate, when two egg-shaped knobs grow together—*Orchis Morio* (9).
Tuberose, having rounded fleshy underground enlargements of the stem, as the Potato.

The Stem.—As the root descends from the central axis of the plant into the ground, so the stem ascends into the air, bearing leaves and branches. In the simpler cellular plants the stem is scarcely distinguishable from the general mass. In herbaceous plants the stem is soft, without woody fibres, and annually withers away; it is termed *caulis*. The hollow knotted stem of grasses and reeds is called *culm;* the stem of palms *stipe;* permanent woody stems are called shrubs and trees. Stems are generally round, either plain or ribbed; sometimes triangular, more rarely square. Some stems are so weak as to lie on the ground, when they are called *procumbent;* others, for support, climb round larger erect trees, and are called *climbers*. Some of these twist their stems from right to left, as the convolvulus and passion-flower; others from left to right, as the

hop plant and honeysuckle. Some herbaceous stems live only for one year, and are called *annuals;* others lasting for two years, *biennials;* many are longer lived, and are called *perennials.* In herbaceous perennials the root alone survives in winter, from whence in spring shoot out leaves and stem. In some herbaceous plants, as the primrose and dandelion, there is no stem—the leaves spring immediately from the caudex of the root: these are called *acaulescent;* in others the short stems remain buried in the soil. Some plants, as the strawberry, throw out *runners,* which creep along the ground and throw out leaves and roots, so that they soon become independent plants. Some of these creepers, half stem half root, are called *rhizomes. Tubers,* as the potato and Jerusalem artichoke, as also the crocus, arum, and colchicum, partake of this mixed character. The *bulbs,* as the onion, lily, leek, are subterranean buds.

The stems of exogenous plants send out buds and lateral branches, and the points whence these are produced are called *nodes.* Endogenous stems have no branches, but only leaves growing from their extremities, called *terminal.* The stem gives support to the leaves and flowering organs, and is the medium through which the ascending and descending sap flows to all parts of the plant. Many trees acquire a very great circumference of trunk or stem, and go on accumulating woody fibre for many centuries. Some trees attain a height of 100, 200, and 300 feet, with diameters of 3, 6, 10, and even 30 feet. The baobab tree is said to attain a circumference of 90 feet, and some chestnut-trees are 60 feet in girth. The oak will continue to grow for 500 years; the olive-tree for 1000 years. A chestnut-tree on Mount Etna is supposed to be 1000 years old, and the great dragon-tree of Teneriffe, shattered by a storm in 1868, was said to be over 5000 years of age.

The character of the stem differs materially in the three great divisions of plants. The *acrogenous* stem, as in the tree-fern, is composed of bundles of cellular and vascular structure which shoot up simultaneously, and the farther elongation takes place by additions to the summit, hence the name *summit growers.* The stem is formed by the union of the stalks of the fronds or leaves, which expand upon the summit. The stem forms no branches, but is marked on its surface by the scars of the leaves which have fallen off. A section of the stem exhibits, near the circumference, a series of waved, irregular, dark lines, which is the condensed vascular tissue, while the centre consists of a uniform mass of paler dotted vessels. The section of the root stem of the common fern will exhibit this appearance. The *endogenous* stem, as the palm, is also composed of bundles of vessels, but more compact than the other. The growth proceeds by the new matter from below elevating the central matter, and thus the elongation and breadth are both increased from a pushing out of the matter from within; hence the term *inward growers.* A cross-section of an endogenous stem (Pl. XVII. XVIII., figs. 30, 31) exhibits a similarity of the cellular structure throughout, without any central pith or medullary or annual layers (as are exhibited in the exogenous sections, figs. 18, 19, 27, &c.), and without any true bark, but only a thicker and more condensed condition of the cellular structure on the outer circumference. The *exogenous* stem, such as the oak and elm, exhibits a section composed of various cellular and vascular bundles, arranged in successive circles, from the central pith outwards to the circumference. The growth in this case takes place by an annual succession of rings of new wood externally, and hence the term *outside growers.* In fig. 28 *h* is the centre of such a section, where the medullary cellular structure is seen; *g* is the *medullary sheath,* consisting chiefly of spiral vessels; *m* is a *medullary ray,* formed chiefly of condensed spiral vessels radiating from the central pith; *f* is the woody tissue, a layer of which is deposited each year, thus forming a number of concentric rings, by counting which the age of the tree may be known; *e* is the *cambium* layer of mucilaginous semi-fluid matter between the wood and the bark, constituting the active and formative tissue of dicotyledonous stems, by means of which they are enlarged. The bark consists of two or three layers, an inner green and succulent, the *liber* or *endophlœum, d;* a middle cellular portion, forming cork in the cork oak, *b, c;* and an external *epidermis* or outer bark, *a,* which is frequently colourless, as in the beech, and semi-transparent or white, as in the birch. The extent of the annual circle varies in size in the same tree, according to its age, state of vigour, exposure, and the nature of the season—cold, ungenial summers often retarding the growth of the tree. The central woody circles become hardened and condensed by age, so that the sap flows most copiously through the outer and newer circles. Referring again to Pl. XVII. and XVIII., figs. 1 to 10 are magnified representations of some of the manifold appendages which are attached to the epidermis of plants, in the shape of hairs, bristles, scales, &c. Fig. 4 is a sting of the nettle, which contains a duct to convey the poisonous fluid secreted by the gland at its base. Figs. 11 and 12 show the arrangement of the cells in the outer bark of the birch. The first is a vertical, the second a horizontal section. In fig. 13 *a* is the cellular tissue, *b* the woody fibres, *c* annular, spiral, and reticulated vessels. Fig. 14, A is a transverse section, B the corresponding longitudinal section, *a* vessels, *b* liberine or bast cells, *c* woody cells. Figs. 15 *a* and 15 *b*, *wh* root-hairs (see also figs. 16 and 17), *w* spongiole, *ar* outer layer of epidermis, *ir* inner do., *g* vascular tissue. 18, 19, 21, and 27, cross-sections of dicotyledonous stems, showing the pith, the medullary rays, &c. In 18 and 19 the inner dark ring is the medullary sheath, the outer the cambium layer; 19 *b*, a secondary medullary ray, isolated by the growth of the tree. In fig. 21 the medulla is seen to occupy the greater portion of the stem. Fig. 24, *ar* outer, *ir* inner layer of the bark; *k* suberaceous or corky tissue completely formed; *jk* young cells not yet converted into cork; *e* epidermis. Fig. 25 shows medullary rays extending into the liber or inner bark; in 26 the rays are seen in the interstices of the bast fibres. Fig. 34, *oe* upper, *ue* lower epidermis; *op* upper, and *up* lower layer of parenchyma; *sp* one of the stomata. The following explanatory references regarding stems are made to Pl. XV.

Caulis, peculiar to herbaceous plants, the principal stem elevating the leaves and flowers (13).
Culm, the proper stem of the grasses, may be simple or branched, knotted or knotless, bristle-like, with or without a sheath (130).
Frond, when the stem, leaf, and fructification are united—Ferns (19).
Peduncle, the flower-stalk, supporting only flowers (17).
Petiole, the leaf-stalk, bearing only leaves (18).
Scape, a stem elevating the flowers only, as in the Narcissus, &c. (207 *b*).
Seta, the stem which bears only the fructification of mosses (142 *a*).
Stipe, the stems of mushrooms, palms, and the pappus of some seeds (141, 172).
Surculus, the stem which bears the leaves of the mosses (140).

Leaves.—In the simplest forms of plants, as the fuci and others, the cellular structure expands from a centre, with no distinction of stem, roots, or leaves. In monocotyledons, or those plants which increase in growth by upward expansion, the leaves are elongations of the axial roots and stems, in a perpendi-

cular direction, as in grasses, palms, lilies. In dicotyledons the leaves proceed from various points or nodes of the axis, at the peripheral termination of the medullary rays, in a horizontal direction. Leaves are more temporary organs than the roots or stem; they are constantly falling off, and becoming renewed at intervals during the growth of annual plants, annually in many perennial plants, and at various intervals in what are commonly termed evergreens. The seed-lobes of monocotyledons and dicotyledons are primary leaves, which swell out and become cellular in the first stages of germination, and afford nourishment to the germ, remaining below, or sometimes rising above ground with the expanding stem. The general form of a leaf is that of a flat, expanded surface, variously shaped, called the *lamina*, disk, or blade, and a stalk of varying length, called the *petiole*, by which it is attached to the stem or branch. Sometimes this petiole is so short as to be undistinguishable from the base of the leaf, when the latter is said to be *sessile*. At the base of the petiole is sometimes a small, leafy appendage, called *stipule*. The petiole extends along the centre of the leaf, where it is called the midrib. In monocotyledons, several parallel portions of the elongated petiole traverse the length of the leaf without branching; in dicotyledons, the midrib ramifies into numerous branches. These portions of the leaf are composed of dense vascular tissue, are commonly known as the ribs, veins, or nerves, and serve as a support or framework; the intermediate portions are composed of cellular tissue, or parenchyma, copiously supplied with green granular matter called chlorophyll; over all extends the epidermis, or thin bark, consisting of compressed colourless cells. This epidermis is perforated by holes or *stomata*, for the free admission of air. Leaves generally have a distinct upper and under side. The upper side is commonly of a deeper green colour, with denser epidermis, than the under, which is paler, more or less covered with hairs, and in horizontal leaves contains more stomata than the upper side. In vertical lying leaves the stomata are usually nearly equal in number on both sides; in the floating leaves of aquatic plants the stomata exist only on the upper surface.

Leaves may be either single, simple, or entire, composed of one uniform disk, or variously divided and subdivided, forming compound leaves. When on a central petiole there are placed a number of distinct disks, pinnæ, or wings, the leaf is said to be *pinnate*. When, instead of simple pinnæ, or single leaves, there is a subordinate set of petioles branching off from the central one, also furnished with pinnæ, the leaf is said to be *bipinnate;* when the venation is farther ramified, *tripinnate*. Leaves which spring directly from the caudex of the root are called *radical*, or *caudal;* when from the upper point of a stem or branch, *terminal;* when on flower-stalks, *floral*. When leaves spring symmetrically from opposite sides of a stem, they are said to be *opposite;* when at intermediate intervals, *alternate*. *Buds* are the embryo leaves before they expand, and in cold climates are covered with a protecting sheath, which is sometimes glazed over with a resinous matter. The various forms of leaves are represented in Pl. XV.

Acerose, needle-shaped, a rigid linear leaf, like the Pinus (116).
Acinaciform, shaped like a scimitar, a thick leaf, with one side sharp, and the other broad (88).
Acuminate, when the point is lengthened out (61).
Acute, when tapering gradually to a point (60).
Alternate, when placed alternate (119).
Articulate, jointed (118).
Amplexicaul, when the lobes of a *sessile* leaf embrace the stem (111).
Angular, of various angles. *Triangular* (34), *Quadrangular*, *Quinquangular*, &c. (41).
Auriculate, ear-shaped, nearly *hastate*, but the lobes rounded, and smaller.
Axillary, when standing at the origin of the branch.
Canaliculate, when the midrib is furrowed or channeled (8).
Capillary, when like a hair. *Pilose*, hairy, long fine hairs (87).
Carinate, when the midrib is formed like the keel of a ship.
Carnose, fleshy, when there is a pulpy soft substance, as in Houseleek.
Cartilaginous, when the margin is harder than the disk of the leaf (55).
Cauline, when attached to the principal stem.
Ciliated, fringed with long hairs, distant from each other (66).
Concave, hollow in the middle of the leaf.
Connate, when opposite *sessile* leaves are closely united at their base into one substance (109).
Cordate, heart-shaped—*Lamium album* (47). *Obcordate*, inversely heart-shaped (38).
Crenate, notched, with small teeth, whose points stand at right angles with the midrib.
Crenate-acute, sharply notched, points at right angles with the axis of the leaf (68).
Crenate-obtuse, bluntly notched, as above (69). *Crenate-duplicate*, doubly notched (54).
Crisp, when fuller on the margin than the middle, the former curled (58).
Cuneiform, when blunt-pointed, and tapers to the base like a wedge. *Cuneiform-emarginate* (81).
Cuspidate, when the *acuminate* leaf ends in a bristle.
Decurrent, when the substance of the leaf runs down the stem (112).
Decussate, when set in four rows, forming a St. Andrew's cross.
Deltoid, when short, and bounded by three broad surfaces, like the letter delta (84).
Demerse, when the leaves are found below water.
Dentate, when small distinct teeth are placed on the margin (51).
Dependent, when the base turns to the zenith, and the apex to the earth.
Distichous, when the leaves stand in two rows, as in Yew and Pitch Fir.
Dolabriform, when a fleshy leaf is compressed, and shaped like an axe (77).
Emarginate, notched deeply at the apex, a portion taken out (79).
Ensiform, sword-shaped, like the Iris.
Erect, when the leaf forms a very acute angle upwards with the stem (127).
Erose, gnawed, unequally sinuated, as if bitten at the edges (43).
Fasciculate, when the leaves stand in tufts, as in Larch, &c.
Fid (in terminations of words), split or cut half-way down.
Flabelliform, when shaped like a fan.
Frond, the leaf-like organ of ferns bearing the fructification (95).
Gibbous, when both surfaces are convex, or seem swelled out.
Hastate, halbert-shaped (42).
Hispid, beset with rigid bristles (73).
Horizontal, when the upper surface of the leaf makes a right angle with the stem (125).
Imbricate, when one leaf overlaps another, like tiles on a house (117).
Incised, divided by deep incisions.
Incurved, when bent in at the point towards the stem.
Inflexed, bent upwards and inwards at the apex (128).
Laciniate, torn, when there are several irregular clefts in an oblong leaf (46).
Lanceolate, shaped like a spear, gradually narrowing to the point (31).
Linear, of equal breadth from the base to the apex, margins nearly straight (32).
Lineate, streaked with depressed but not always parallel lines.
Linguiform, when a compressed leaf is somewhat tongue-shaped (74).
Lobate, deeply divided into lobes (57). *Trilobate*, three-lobed (39).
Lunate, moon-shaped, like the moon in her third quarter (48).
Lyrate, lyre-shaped, margin-bayed, extreme segment large and round (89).
Membranaceous, like a membrane, when without any pulpy substance.
Mucronate, when a blunt-ended leaf ends in a bristle.
Natant, when the leaf swims, as in Water Lily.
Nervose, when the vessels run in parallel lines from base to apex (83).
Oblique, when in a direction between horizontal and perpendicular.
Oblong, considerably longer than broad (30).
Obtuse, when the end of the leaf is blunt (59).
Obtuse-mucronate, blunt, but terminating with a point (62).
Opposite, when the leaves are set on opposite sides of the stem (120).
Orbiculate, when the circumference is in all points at equal distances from the centre (40).
Ovate, egg-shaped, nearly oval, but the diameter greater at the base than at the apex (28). *Oval* (29).
Palmate, when more than half-way divided into five or six finger-like lobes (44).

Panduriform, fiddle-shaped, having a deep curve or bay on both sides of an oblong leaf (129).
Partite, or *Parted*, divided down beyond the middle (49).
Papillose, covered with scales or fleshy pimples—Eryngium (75).
Peltate, when the foot-stalk is inserted into the disk of the leaf (115).
Perfoliate, bored through, the stem passing through the leaf (110).
Petiolate, when a leaf has a foot-stalk (114).
Pinnæ, the leaflets or primary divisions of a compound leaf.
Pinnate-abrupt, a winged leaf ending with an odd one (97).
Pinnate-articulate, winged, the common foot-stalk jointed (94).
Pinnatifid, when the incisures or bays go almost down to the midrib (45).
Plicate, when the leaf is laid in regular folds (70).
Punctate, dotted, having dots or points instead of veins or ribs.
Quaternate, four leaves round the stem (121).
Radical, when they spring from the root, as in *Viola odorata*.
Radicant, when the leaf strikes roots.
Ramose, when rising from the branches.
Reclinate, when standing with its point towards the earth (124).
Reniform, kidney-shaped—Ground Ivy (35).
Repanded, serpentine, small sinuses without angles on the margin (50).
Reticulate, when the veins are like net-work.
Retrorse-sinuate, the wide indentations pointing to the base of the leaf (65).
Retuse, slightly and bluntly notched at the end.
Revolute, when rolled backwards with its point to the stem (123).
Rugose, wrinkled, when the surface is raised between the veins (67).
Runcinate, when the incisures of a *pinnatifid* leaf are pointed and bent downwards.
Sagittate, arrow-shaped, the lobes pointed and bent outward like barbs (36).
Sagittate-cordate, something between arrow and heart shaped (37).
Seminal, when they grow out of the seed-lobes when germinating.
Serrate, when the point of the teeth are turned to the apex like a saw (52).
Serrate-duplicate, doubly saw-cut, small teeth on the larger (53).
Sessile, when fixed to the stem, and there is no foot-stalk (113).
Sinuate, sinuated, when shallow bays are cut out of the margin (63).
Sparse, when they stand thick on the stem, scattered without order.
Spinous, when set with spines, as in the Thistle.
Squarrose-laciniate, when the incisures run in every direction, as in the Thistle.
Stellate, or *Verticillate*, when several are set star-like round the stem (122).
Subulate, awl-shaped, a linear leaf sharply pointed (33). *Subrotund*, somewhat round (27).
Sulcate, furrowed, ploughed with deep lines (82).
Terete, round, when formed like a cylinder (78).
Ternate, when three leaves stand round the stem.
Tetragonal, when a long leaf is bounded by four narrow surfaces.
Tomentose, downy, covered with a cotton-like substance (80).
Triquetrous, when bounded by three narrow long sides (85).
Truncate, when the point of a leaf is cut off or ends in a straight line (56).
Tubular, when hollow within, like the leaves of the Onion.
Uncinate, when a leaf has a hook-shaped appearance.
Undulate, waved, when the margin is bent upwards and downwards.
Unequal, when one lobe is larger than the other.
Vaginate, sheathed, or sheathing the stem (108).
Venose, or *Venous*, when the fibres or veins are branched from the midrib (72).
Verrucose, warty, having little lumps or warts on the surface.
Verticil, or *Whorl*, a ring of leaves. See *Stellate*.

When there are several leaves or leaflets on one foot-stalk, they are termed *compound leaves*. Under the following heads will be found most of the varieties which compound leaves assume with regard to arrangement:—

Bifoliate, having only two leaflets to a leaf (71). *Bipinnate*, doubly pinnated (107).
Biternate, when a foot-stalk separates into three, bearing three leaves on each point (98).
Conjugate-pinnate, when a foot-stalk divides, and each pair makes a pinnated leaf (103).
Decompositе, when the primary leaf-stalk divides, each division forming a compound leaf.
Digitate, when the bases of several leaves rest on one kindred foot-stalk (75).
Digitate-pinnate, when four or five simply pinnated leaves are fixed to one foot-stalk.
Multijugate, with many pairs of pinnæ.
Patent, when expanding in a direction nearly horizontal (126).
Pedate, when there is some resemblance to the foot of a bird, as in Black Hellebore (101).
Pinnate, winged, when a series of leaflets, on the same plane, are fixed to one foot-stalk (100).
Pinnate-cirrhose, winged, and terminating with a tendril (93).
Pinnate, leaflets alternate, the leaflets placed alternately on the foot-stalk (104).
Pinnate, leaflets decurrent, winged leaf, leaflets running down the stem (90).
Pinnate, leaflets interrupted, smaller and greater leaflets intermixed (91).
Quinate, when five leaves are fixed to one foot-stalk.
Supra-decompound, when more than doubly compound.
Ternate, when three leaves are supported on one foot-stalk (105).
Doubly ternate. See *Biternate* above.
Ternate-sessile, a ternate leaf without foot-stalks (99).
Trigeminate, when the former has two leaves at the division of the principal stalk.
Tripinnate, when several doubly pinnated leaves are fixed to one common foot-stalk (106).
Abruptly tripinnate, triply pinnate, or thrice winged abruptly (106).
Terminally tripinnate, triply pinnate, or thrice winged, terminating with an odd leaf (92).
Triternate, triply ternate, or triply divided into three leaves (102).

Certain appendages of the stem and leaves are represented in Pl. XV.

Aculeus, a prickle, formed from the bark, as in the Rose, Briar, &c. (26).
Ampulla, a hollow bladder, found at the roots of some water plants—Utricularia (15).
Anulus, a thin membrane, like a ring, surrounding the stalk of the fungi (133 *a*).
Arista, the awn or pointed beard of some of the Grasses.
Ascidium, a cylindrical hollow leaf containing water, sometimes completely covered, opening occasionally—Nepenthes (163).
Bracts, floral leaves situated among the flowers, generally differing in shape and colour from the leaves of the plant—Orchis (23).
Gemma, the bud which contains the embryo of the leaves and flowers (143).
Glandule, a round body, which either secretes or transpires fluids (158).
Indusium is a thin membrane which covers the flowers or seeds of ferns (171).
Ligule, a small transparent strap situated on the margin of the *vagina*, and at the base of the leaf—Poa, &c. (135).
Pili, slender fine bodies, like hair, covering some plants (22).
Spine, a thorn, formed from the woody part of the plant—Cockspur Thorn (25).
Stipules, small leaves or scales situated at the base of some of the foot-stalks or leaves—Vicia, Lathyrus (20).
Tendril, or *Cirrhus*, a slender, twisted, thread-like body, which serves weak plants to clasp other bodies for support—Vine (21).

Physiology of Nutrition.—A plant is an organism endowed with vitality—a peculiar power acting from within—which, under the influence of certain external conditions, enables it to assimilate inorganic elements, and compound these into substances called organic. This vital power, at the same time that it acts in concert with the chemical and mechanical laws of matter, does also control these, and has actions independent of them. Thus a plant shoots its stem upwards, independent of gravity, and its root downwards through the resisting soil. While possessed of the vital energy, it lives, and grows, and maintains its saccharine, albuminous, mucilaginous, and other juices, unaffected by chemical agencies; but no sooner does this vital energy cease, than it is said to die, and then its whole substance begins to be acted upon by chemical and mechanical agencies, till at last it is resolved into the inorganic elements of which it was originally composed. The smallest particles of vegetable structure, a cell or two, or a series of minute cells aggregated together, are sufficient to carry on the functions of vegetable life; and it is by transmission that this organism descends from plant to plant in a continued series of specific forms. In treating of the physiology of plant life, then, we must assume the existence of an organism already formed and peculiarly endowed;

for the manifestations of vegetable life imply a power and an arrangement of laws different from those that are manifested in any purely inorganic bodies, or combinations of those bodies. The conditions necessary to stimulate and maintain the living actions of plants are—moisture, air, heat, and light. We may have the organism existing within the dry seed for months and years, and yet remaining dormant until all these necessary stimuli are applied to rouse it into action. We know the food of plants from the composition of plants themselves, which, in a general way, may be estimated at—

Carbon	40	per cent.
Oxygen	40	,,
Hydrogen and nitrogen	10	,,
Earths and salts	10	,,

making up, in round numbers, 100 parts. Recent plants contain a large proportion of watery fluid, so that water, carbonic acid, nitrogen, and hydrogen, chiefly supplied by ammonia, and a proportion of earthy salts, form the chief food of plants. These substances are absorbed or taken in by the plant from the atmosphere, and from water, either in a state of vapour or from the moist soil. We may easily perceive, then, that the actual processes carried on within the plant are the decomposition of carbonic acid and water, the fixation of pure carbon, the combination of two or more of the organic elements already enumerated into new and peculiar organic compounds, as sugar, starch, oils, acids, and the chemical formation of neutral salts out of the earthy and metallic bases, already also enumerated. It has been stated that a very simple, and even very minute organism is sufficient to carry on vegetable life. A large amount of vegetable forms belong to the lowest class, where even the distinction of root, stem, and leaves is not manifested, the mere aggregation of cellular structure, and the formation of a few simple tubes and vessels being all that is necessary, through which the juices move, the air permeates and exhales, and the vital and chemical elaborations are performed. In the higher classes of vegetables, however, a more marked distinction and separation of organs are manifest, and here it is evident that each organ has some one or more peculiar function. A tree, for instance, not only requires its roots and stem, but its green leaves, in order to perform its functions; for strip a tree entirely of its leaves, and its vital actions, for the time, cease. This separation of organs, and more complicated form in the higher order of plants, enable them also to elaborate products which are not found, or at least not so perfectly found in the lowest classes. Of this nature are the highly nitrogenous and amylaceous products of the cotyledonous fruits, and the gums, and resins, and essential oils of many shrubs and trees.

Although we are still very deficient in our knowledge regarding the precise assimilative operations which take place within the bodies of vegetables, yet there are certain circumstances which seem to be pretty well established. First, that there is a great and general process of absorption going on in plants—a taking in of fluids and gases, which has been termed *endosmose*, or inward impulse. This seems partly a mechanical or inorganic movement; for it is easily demonstrated that a fluid in which gum or sugar is dissolved will readily attract or draw up a thinner or lighter fluid, as water or alcohol, even through the porous structure of an animal or vegetable membrane. Secondly, it is ascertained that there is a free and pretty constant intermingling or communication of the fluids and gases contained within the cells of a plant, as also a free exhalation, called *exosmose*, or outward impulse. In the higher orders of plants, especially in spring, there is a constant and forcible flow of sap from the roots upwards. In the succulent vine the sap thus flows with a force equal to the pressure of the whole atmosphere, or 15 lbs. on every square inch. This is a force five times greater than the most vigorous circulation of blood in the aortal artery of the horse. As the green chlorophyll, so conspicuous in the leaves of plants, seems to have some intimate agency in conjunction with the sun's rays in decomposing the juices and gases of the cells, and most probably in recompounding those substances anew, we have every reason to infer that the leaves of trees chiefly perform this duty, as the trunk and branches and other exposed parts are covered with thick and tough bark, so far impervious to the sun's influence, and also unfurnished with chlorophyll granules. We may thus presume a kind of circulation in the juices of trees and all the larger plants. In the old, central, dry layers, less sap evidently flows than in the more recently formed circles, while in the cambium, or most recent external layers, the cells are filled with elaborated juices, flowing partly downwards and partly in a horizontal direction to all parts of the stem and branches, and even downwards to many succulent roots, as tap-roots and bulbs. Circular and spiral motions may thus be seen in the cells of Chara and in Vallisneria, where currents are observed carrying along granules of chlorophyll, some of which are seen stopping, and adhering to the sides of the cells. Similar facts are observable in the juices of Potamogeton and other aquatic plants. Among the first who threw a dawn of light upon the nature of the internal assimilation of plants, was Priestley. He observed that when a growing sprig of mint was put into a glass of water, and exposed to the influence of the sun's rays, bubbles of gas were given out; this he ascertained to be oxygen. Saussure also established that during the day, and while exposed to the sun's heat and light, plants gave out oxygen, but during darkness this process ceased, and carbonic acid was evolved. The leaves and other green parts of plants are found to possess this property of eliminating oxygen, while those other parts of the plant not green, as the bark and root, are said to absorb oxygen, and give out carbonic acid. Other observers have so far mystified these leading facts, by stating that both oxygen and carbonic acid are given off during the day, and deem it unaccountable that carbonic acid, the natural food of the plant, should be evolved during the night, or evolved at all. But it must be borne in mind that during the day, and especially in sunshine, is the period when the plant really digests or eliminates the products of its cells; we are then to expect the fixation of carbon, and the extrication of the superabundant oxygen; while during the night, and absence of the solar rays, the digestive process ceases, and the feeding process, or the absorption of carbonic acid from the soil, continues to some extent. The carbonic acid evolved during the night, then, may be this excess of the gas, which, being absorbed by the roots, remains unappropriated, and is partly evolved by exhalation from the leaves. Unlike animals, plants do not feed on organic matter, as such; organized substances must be decomposed before they become the food of vegetables; the organic elements must be in an aeriform state, or in a state of vapour or fluidity, and earthy substances must be dissolved in water. A certain elevation of temperature, and that peculiar action or property of the sun's rays called *actinism*, are also necessary for the active life of plants. Growing plants evolve electricity; but how far this is simply connected with the change of form of aerial and fluid bodies, as they pass from solids to fluids and gases, is not known. Plants generally are not

found, like animals, to maintain a proper heat above that of surrounding bodies, although not a few, at the period of inflorescence, do manifest an elevation of temperature. From the changes from gaseous to solid conditions, which the substances of plants are continually undergoing, there is every probability that an evolution of heat does take place, though it has been difficult experimentally to render it palpable. The following table exhibits a view of the component parts of the most common vegetable products:—

	Carbon.	Oxygen.	Hydrogen.	Nitrogen.	Ash.
Starch	12	10	10	..	..
Sugar	12	9	9	..	..
Gum	12	11	11	..	..
Tartaric acid	8	10	4	..	..
Citric acid	12	12	4	..	..
Malic acid	8	8	4	..	..
Lignine or woody fibre varies from	12	10	10	..	..
to	50	44	5	..	..
Wheat grain	46	43	5 8	2·3	2·4
Oats	50·7	36·7	6·4	2·2	4·
Pease	46·5	40·1	6·1	4·2	3·1
Potatoes	44·	44·7	5·8	1·5	4·
Turnips	42·9	42·2	5·6	1·7	7·6
Hay	45·8	38·7	3·0	1·5	9·0

These elements vary in different parts of the same plant; the seeds of the cerealia abound most in nitrogen, forming azotized products, as gluten, fibrine, albumen.

Reproductive Organs.—A plant, after developing its stem and leaves, and extending its growth to the full size, at a certain period begins to form embryo germs for the propagation of its peculiar species. With the whole tribe of annual plants this latter process closes and completes its existence. Perennial plants repeat this process every year, and some even oftener, while others become reproductive only after the lapse of many years, as the aloe, yucca, Palmyra palm, and some others. The simpler plants, as the algæ, mosses, ferns, produce no proper seed, but merely germinal buds or sporules, which are produced on the stems or fronds, and, falling off, vegetate in the soil, somewhat as buds are developed into leaves and branches on the parent tree. The plants of this division were termed by Linnæus *cryptogamic*. The other two divisions of plants with conspicuous flowers and cotyledonous seeds are termed *phanerogamic*. The mode in which flowers spring from the parent stem or branch is very various, and is called the *inflorescence*. Flowers may either spring from the extremity of the axial stem, when they are called terminal, or they may proceed from the axil of a leaf, called a *bract*, or from sheaths, called *spathes*, as in the palms. Flowers are produced either single or solitary, or grouped together in various compound and decompounded wreaths. The stem bearing such floral wreaths is called the floral axis; a single flower is supported by a *peduncle*, of which the *rachis*, or central stem of the inflorescence, is a prolongation. The various forms of inflorescence are represented in Pl. XVI.

Amentum, when the flowers are thickly set upon a slender foot-stalk, with intervening scales, as in Hazel, Birch, Oak, &c. (131).
Capitulum, when a number of flowers stand thick on one stalk, either of a spherical or roundish form, like a head (132).
Corymb, when the foot-stalks of a raceme are lengthened out to a flat surface—Iberis (138).
Cyme, a number of branched foot-stalks rising from a common point, as in Elder, &c. (136).
Fascicle, an irregular cluster or bundle, as in Sweet William.
Panicle, when a number of flowers are standing on long foot-stalks, unequally divided, as in Poa and many of the Grasses (134).
Pileus is the cap or top of a mushroom supported by the stalk (133 c).
Raceme, when every flower has a short foot-stalk, as in the Currant, &c. (158).
Spadix, an axis bearing numerous closely-packed sessile flowers inclosed in a *spathe*, peculiar to Palms and a few other plants (152 a).
Spike, an inflorescence consisting of a number of flowers sessile on a long axis—Wheat (154).
Spikelets, the small clusters of flowers in grasses, covered by the *glumes* (153).
Thyrsus, when a panicle is condensed into an ovate form, as in Privet.
Umbel, a number of flower-stalks, of one length, issuing from a common centre, like the radii of a circle, as in Hemlock; they may be simple or compound. *Universal Umbel* (161 a a). *Partial Umbel* (b b). *Involucrum* (c c). *Involucellum* (d d).
Verticil, or *Whorl*, when flowers encircle the stem in rings—Mentha (157).

The flower or blossom comprehends all those parts engaged in the formation and completion of the seed which contains the germ of the future specific plant. The flower may be divided into the external or protective parts, some one or more of which may be awanting; and the essential and constant internal reproductive organs. The parts of the flower have a cellular structure, nearly identical with that of the leaves, and are developed in a similar manner, and are in some respects resolvable the one into the other. A flower, when complete, is composed of four concentric circles or whorls. The outer is the *calyx;* the next the *corolla;* in the centre are the *stamens* and *pistils*. Each of these circles may be made up of three, four, five, or six segments or parts, or multiples of those parts. In monocotyledons three, four, and six are the characteristic numeral divisions; in dicotyledons five, ten, twenty. The *calyx* or cup is based upon the peduncle or flower-stalk, and is generally, like it, of a greenish colour; it is either formed of one entire piece, more or less notched or lobed, or made up of several *sepals*. The calyx is frequently absent, or it is replaced by a *perianth*, which is something intermediate between calyx and corolla, as in the tulip. The *corolla* lies next to the calyx, and is generally the coloured part of the flower, assuming various hues of delicate beauty, either plain, mottled, or symmetrically streaked. The *stamens*, which vary in number in different plants, surround the *pistil*, which forms the centre of the flower. The stamen consists of a *filament* or stalk, supporting a folded-up body, called *anther;* this anther contains a granular powder, called *pollen*, which, when matured, is shaken out through openings in the anther. The *pistil* consists of the *style* or central stem, terminated at the upper point by a round porous knob, called *stigma*, and passing at the base into the *ovary* or seed-lobe, which may contain one or many cavities. The pistil may be composed of one or more folded pieces, called *carpels*. The most remarkable forms of the flowering organs will be found delineated in Pl. XVI.

CALYX.

Amentum, catkin, chaff-like scales, among the flowers, as in Hazel, Willow, &c. (131).
Calyculate, having bractioles resembling an additional calyx, as in Dianthus (162 b).
Calyptra, a veil, like an extinguisher, as in some Mosses (142 b).
Glume, a husk, the chaff of Oats, Barley, Wheat, and most Grasses (137).
Involucrum, a cover or fence, when standing remote from the flower, as in Scabiosa (24); Hemlock (161 c c).
Perianth, when it embraces the flower, as in Rose, Pink, &c. (212 a).
Spathe, a sheath bursting lengthways, as in Snowdrop, Narcissus (152 b).
Volva, a curtain surrounding the stem and attached to the pileus or top of Fungi (133 b).

Modifications of the Calyx.

Abbreviate, when considerably shorter than the corolla.
Caducous, falling off before the flower—*Papaver somniferum*.

Deciduous, falling off at the same time with the flower—*Tilia Europæa*.
Double, as in Malva, Althea (164).
Entire, not cut on the margin (155).
Fid (as termination), when the segments are cut down to the middle of the tube.
Monophyllous, consisting of one leaf (147). *Polyphyllous*, consisting of two or more leaves (150).
Partite, or *Parted*, divided beyond the middle and near to the base.
Persistent, remaining after the flower falls.

COROLLA.

Campanulate, rounded at the base, and gradually widening towards the mouth, like a bell (146).
Difform, when the tube, after expanding, divides into unequal lobes—Lonicera.
Globose, when, like a sphere, it widens out gradually to the middle—Vaccinium (144).
Hypocrateriform, when the tube is long, and the rim flat and broad, like a salver—Phlox (145).
Infundibuliform, an obverse cone, flat and turned out at the rim like a funnel—Datura (139).
Ligulate, when a short tube terminates in a long expansion on one side, like a tongue, as in Dandelion (148).
Personate, when the lips of a ringent corolla are close shut up, and the stamens and the pistils masked—Snap-dragon (149).
Ringent, a corolla having two segments, like the lips of an animal gaping—Lamium (159).
Rotate, when the tube is very short, and the rim flat, like a wheel—Verbascum (160).
Tubular, or *Tubulose*, when like a hollow pipe of nearly equal diameter throughout—Red Valerian (165).
Unilabiate, upper or under lip of a ringent corolla is wanting—one-lipped—Ajuga (167).

POLYPETALOUS COROLLAS are termed

Caryophyllaceous, when five petals are shaped and disposed as in Clove, Pink, &c. (166).
Cruciate, when four petals stand opposite to each other, cross-like, as in Stock, Mustard, &c. (179).
Irregular, consisting of two or more petals of different lengths and inclinations.
Liliaceous, when plants have one, three, or six petals, three or six stamens, a bulbous root, and leaves with longitudinal fibres, as in the Crocus, Lily, &c. (195 a a).
Malvaceous, when five petals are attenuated downwards, so as to unite close at the base, as in Mallows, &c. (164).
Papilionaceous, butterfly-shaped, having four petals, the *vexillum*, *carina*, and the two *alæ*, as the Pea (177).
Rosaceous, when the petals are rounded, and have no claws at the base, like the Rose (193).

STAMEN.

Articulate, when there are evident joints or commissures.
Capillary, equal thickness, as fine as a hair. *Filiform*, thicker than a hair, thread-like (173).
Connate, joined.
Connivent, when the filaments bend to one another at their tops.
Cuneiform, compressed, tapering to a point, wedge-like. *Dilatate*, broad, widened out (175).
Declinate, when, without describing a large circle, they turn downwards.
Geniculate, bent at the joints like a knee. *Incurved*, bent in from the middle, bow-like (176).
Pedicellate, when standing on foot-stalks, as in Sage.
Plumose, feathery. *Pilose*, hairy.
Subulate, like an awl, thicker below than above, gradually tapering (181, 212 e e).

THE ANTHER.

Adnate, closely attached on both sides to the point of the filament (174).
Aristate, slender, sharp substances, like awns of Barley (185).
Bifid, cleft, as in the Grapes (184).
Bilocular, having two cells. *Unilocular*, having only one cell.
Cristate, crested with cartilaginous points on the sides or base.
Dehiscent, opening or bursting, which may take place either at the top or at the side.
Dentate, when there are indentations or teeth on the margin (183).
Didymous, when double, or like two joined together.
Globose, round, like a globe. *Oblong*, diameter greater one way than the other.
Horizontal, horizontal. *Incumbent*, lying obliquely on the top of the filament (182, 212 f f).
Linear, when long, flat, and of equal breadth, strap-shaped.
Peltate, when circular, flat on both sides, and attached by the middle.
Reniform, shaped like the kidney of an animal.
Sagittate, shaped like an arrow.
Sessile, sitting, having no filament. *Stipitate*, the filament on a foot-stalk.
Versatile, movable with the wind or any slight cause.

PISTIL.

Angiospermous, the seeds contained in a covering. *Gymnospermous*, the seeds naked.
Germen inferior, when the germen is below the calyx and corolla.
Germen superior, when the germen is above the calyx or corolla (212).
Pedicellate, when furnished with a foot-stalk (169).
Sessile, sitting, when the seed-bud has no foot-stalk.

THE STYLE.

Capillary, slender, like a hair of equal thickness.
Clavate, when thicker above than below, club-shaped (212 c).
Crass, gross, when very thick and short.
Deciduous, falling off immediately after impregnation.
Dichotomous, divided into two branches, each of which is again divided.

THE STIGMA.

Acute, terminating in a sharp point. *Obtuse*, terminating in a blunt point.
Capitate, headed, when globular or hemispherical.
Concave, when hollow in the top, like the Violet.
Convolute, when the divisions are rolled inwards.
Dentate, when set with fine teeth.
Emarginate, when flat and notched on the summit.
Penicilliform, consisting of thick, close, fleshy fibres, like a pencil.
Petaloid, when it has the appearance of a petal (170).
Revolute, the divisions rolled backwards. *Spiral*, when rolled up like a watch spring.
Trifid, three-cleft (212 d).
Uncinate, hooked at the point.

NECTARY, OR HONEY CUP.

Barba, short hairs or soft bristles at the opening of the calyx or corolla—Thymus (208).
Calcarate, when shaped like a cockspur, as in Larkspur, Violet, &c. (194).
Corniculate, when shaped and crooked like a horn—Delphinium (209).
Cucullus, a hollow bag or hood, as in Aconitum (204).
Cyathiform, when formed like a cup, embracing the germen—Narcissus (195 b).
Fornix, the arch, a small elongation on the tube or throat of the corolla, as in Anchusa (205).

RECEPTACLE.

Apiculate, when covered with fleshy, erect, short points, prickly.
Conical, rising to a point in the centre (196). *Plane*, flat (207 a).
Convex, somewhat elevated in the centre (162).
Favose, when pits, like the cells of a honeycomb, cover the surface.
Pilose, set with short, stiff hairs. *Villose*, set with long, soft hairs.
Placenta, the place to which the individual seeds adhere.
Setaceous, covered with rigid bristles.

The sexual organs of plants were known to the ancients. Empedocles mentions the peculiarity of the fig requiring the pollen-dust from another flower to render the female fig blossom fertile. Herodotus relates the same circumstance regarding the Babylonian palm; and Aristotle draws a comparison of the sexual duality of plants and that of animals. It was not, however, till towards the close of the seventeenth century that Millingen and Grew described the real structure and respective offices of the stamen and pistil; and these researches were published by Grew in 1682, in his Anatomy of Plants, while Ray subsequently adopted the same in his Natural System of Plants. Linnæus took up the same subject, and on the sexual organs of the flower constructed his so-called artificial system and nomenclature of plants. The blossoms or flowers of plants, then, besides being the most beautiful objects in organic nature, serve an important purpose, constituting the organs which produce the fruits or seeds for the continuation of the various species of vegetables. The anthers of the

stamens contain the pollen, or fertilizing dust, which in due time is shed upon the pistil; small granules of the pollen, received by the porous stigma of the pistil, become elongated, and entering the ovary, contribute to the development of the ovule or germinal vesicles, one or more of which have previously been formed therein. The importance of this pollen dust is marked by the care with which the arrangements are made in nature for its due transmission to the parts appropriated for its reception. Thus the stamens are placed around, and generally inclining towards the pistil. They are frequently endowed with an irritability, by which they spring forwards with a jerk, and thus shed the matured pollen. The wind, too, serves to shed this fine dust, and even bear it along in clouds through the air; while insects, in their search for honey, pollen, and other vegetable food, are the agents in carrying this fertilizing dust from one plant to another.—The varied beauty of the corolla of flowers, their odours, and the continued succession of different kinds from early spring onwards to late autumn, have been the enthusiastic theme alike of poets and of philosophers.

A flower does not always contain both stamens and pistils. In some plants two kinds of flowers grow, one containing stamens only, and the other a pistil. These are called *monœcious* or one-housed plants, as the nettle, oak, beech, hazel. In other species one plant bears male flowers only, and another the female; these are called *diœcious* or two-housed plants, as the willow, hop plant, date-palm, juniper, yew. The most ordinary form is that of flowers bearing both stamens and pistils. In some cases there is a mixture of single and double sexual flowers on the same or different plants, and these are called polygamous plants. In cryptogamic plants, although there are no distinct sexual organs, yet it is probable that there are two distinct kinds of germ cells engaged in the formation of the germinal sporule. In simple one-celled plants, as Protococcus, the cell from its inner side produces another, which is evolved by the bursting of the parent cell.

Fruit and Seeds.—The fruit is the lower contents of the pistil arrived at maturity. The carpel or united carpels of the pistil, sometimes the calyx, the receptacle, peduncle, and other parts enter into the formation of the *pericarp*. The pericarp contains, or surrounds and protects the seed, as in the pod of the pea, the juicy part of the apple, the woody nut of the almond, the capsule of the poppy, and the siliqua or pod of the wall-flower. The pericarp is composed of three layers, the external the *epicarp*, the middle the *mesocarp*, and the inner the *endocarp*. These three are exemplified in the outer skin, the middle pulp, and the inner core, containing the seeds in the common apple or orange. The succulent pulp of apples, gooseberries, strawberries, contains sugar, malic acid, mucilage, and albumen. Starch is contained in the pulp of the plantain, banana, and bread-fruit—oil in the olive—essential oil in the rind of the lemon and orange. The seed contained within the pericarp is a round or oval body, sometimes flat and covered with two membranes—the outer the *episperm* or *testa*, the inner the *endosperm*. The greater portion of the seed is made up of a starchy and albuminous substance, forming one cotyledon in the monocotyledons, and divided into two halves in the dicotyledons. At one end of the seed, where there is generally an outward mark or depression, as in wheat, or a dark semilunar band or *hilum*, as in the bean, is placed the embryo, a minute body contained in a membrane called the *embryo sac*, and generally surrounded with a portion of albuminous matter. When the seed is put into the ground, and subjected to warmth and moisture, and a sufficient access to air, which is always found in the upper loose soil, the cotyledons begin to swell, and the cellular structure becomes filled with juice; in a few days the membranes of the seed burst, and the cotyledons separate somewhat apart. In many seeds, as in the ash and French bean, the cotyledons rise up into the air and become leaves; while in the meantime the embryo has also swelled out and become full of cells; and, nourished by the juices of the cotyledons, it begins first to send out its radicles, which make downwards into the earth, and next its plumule, or rudimentary stem, and leaf-buds, which ascend into the air. While first germinating in the soil all the parts of the seed are pale coloured, and in this stage light is found to be injurious to, and retards germination, but no sooner does the plumule rear its head above-ground than the influence of the solar rays begins to change the pale blanched cells into a bright green, the light now adds additional stimulus to the growing plant, the nutrient juices of the cotyledonous leaves are rapidly exhausted, they shrivel up, and numerous rootlets, now spreading into the soil, supply juices for the further increase of the stem and leaves. Such is the wonderfully mysterious but beautiful process of germination and fresh growth which is going on in myriads of nature's alembics every day, for the varied purposes of eliminating from the earth, the water, and the air the daily food of animals, together with the luxurious clothing and innumerable domestic conveniences of man. Nor, in the distribution and planting of seeds, is nature in any degree less careful and provident than in their original formation. The cotyledons of seeds form a little storehouse of provision which, if kept dry, will keep sweet and fresh for months, years, and even centuries, till opportunities offer for the due germination of the ovule contained within. Then many seeds are furnished with a downy *pappus*, the remains of part of the calyx, by which they are rendered buoyant, and are carried for many miles on the light summer breeze, and even thousands of miles by the tropic hurricane, or no less readily by the ocean gulf-stream, till they find appropriate soils for vegetating. Then birds and quadrupeds, in their rambles after food, or in their long migrations to distant climes, are ever ready to carry seeds entangled in the feathers or hair of their bodies, or, as in the case of birds, unmasticated in their stomachs; while man, in his systematic migrations, transports with him, as his most valuable treasures, the grains and grasses, the pulse, the potato, and the juicy fruits, which may be totally unknown in the countries to which his adventurous industry has led him.

Many plants have other means of propagation besides that by a seed or spore. Some send off suckers, as the strawberry plant; others, as the willow, can be propagated by a slip or succulent branch, which, when inserted into the soil, immediately begins to throw out roots from the nearest node, and thus becomes an independent plant. Tubers, bulbs, and portions of fibrous roots will also send out new stems; while the artificial process of ingrafting and budding induces a new branch upon a tree of the same or a closely allied species.

For figures of the fruit and seed see Pl. XVI.

PERICARP.

Bacca, a berry, pulpy without valves, seeds in the pulp, as in Gooseberry (188).
Capsule, a membranous vessel containing seed, of various shapes and divisions (190).
Drupe, a pulpy seed-vessel without valves, inclosing a stone, as in Cherry, Plum, &c. (187).
Follicle, a distended membrane of one valve, opening at one side (191).
Legume, a membrane of two valves, seeds fixed to one suture, as in Pea (197).

Lomentum, a two-valved seed-vessel, with cells not opening (203).
Pepo, a succulent fruit, the seeds attached to the rind (206).
Pome, a fleshy or pulpy seed-vessel, covering a capsule containing the seed, as in Apple (198).
Samara, a winged fruit, as in Elm (202).
Siliqua, a long pod with two valves, seeds attached to both sutures (192).
Strobilus, a set of hard-tiled scales, as in the cone of the Fir (189).
Theca, the spore-case of mosses, &c., opening with a lid (199); and *Gland* or *Nut*, as in Hazel, Oak, &c. (200).

SEED.

Ala, a membrane or wing found attached to the back or margin of some seeds or seed-vessels (202).
Arillus, an ill-defined membrane, covering the seed, and sometimes the pericarpium.
Corculum, the little heart (210 b), consisting of the rostellum; (210 c) and plumule (210 d) the former descends into the earth and becomes the root, and the latter ascends and becomes the stem.
Coronula, a little crown or pappus, attached to the seed of the compound flowers.
Cotyledons, the seed-lobes, changing at germination into leaves (210 a a).
Hilum, an external scar or mark, indicating the place of the corculum (210 e e).
Tunic, the outer or inner integument or covering of the seed.

PAPPUS, down, a feathery or hairy crown on the seeds of most compound flowers.

Capillary or *Pilose*, when very fine, like hairs.
Paleaceous, chaff-like scales or small leaves on the top of the seed.
Plumose, down divided like a feather—Tragopogon (178).
Sessile, sitting on the seed without foot-stalk (201). *Stipitate*, supported by a little foot-stalk (172).
Setaceous, when covered with rigid bristles—*Centaurea nigra* (180).

Classification.—The arrangement and classification of plants is termed Systematic Botany, or Taxology.

When we consider how very diversified are the specific forms of plants, and that there are now at the least 100,000 distinct species known to botanists, it is obvious that some mode of classifying these into groups and families, in order to recognize and describe them, becomes absolutely necessary. In the early stages of the science the arrangement of plants was very general and imperfect, being little more than that of herbs, shrubs, and trees; and this arose from the deficient knowledge of their internal and external structures, as well as of the nature and properties of their juices and products. As the knowledge of plants increased, various attempts were made at classification, but it was chiefly on account of their medicinal properties that the earliest arrangements were formed; and in the work of Dioscorides, about the beginning of the Christian era, these qualities were more attended to than their structural or physiological distinctions. Though nature, in her vast diffusion of vegetable life, has made her most obvious and prominent distinctions to consist in specific individual forms, yet the most ordinary student of nature cannot fail to recognize certain marked and great divisions of her work, as well as numerous groups of families which have a strong resemblance and affinity among themselves. To find out some prominent endowments common to all the great chain of vegetable being, yet varying by numberless grades and forms, so as to become the means of systematic arrangement, was the great object then of the scientific botanist. In 1682 John Ray published his arrangement of plants founded on their structural forms, and especially on the distinctions of their seeds, pointing out monocotyledonous and dicotyledonous divisions. His views were slowly and only partially adopted, but they formed the germ of the *natural system of plants*. Linnæus, born in 1707, and while yet a very young man, after making himself acquainted by the most enthusiastic and indefatigable labour with all the then known plants of Europe, conceived the idea of fixing upon the flowering organs as a basis of classification, and with infinite skill and ingenuity contrived his System of Plants. With the scanty amount of structural and physiological botany which he possessed, this system of Linnæus was certainly a wonderful effort. His system is called artificial, but this gives a very erroneous idea of it. It was not unnatural, but partial and limited. A true investigator of actual nature, his facts will stand as long as nature herself; and many of nature's groups at once stood forth in Linnæus' system—such as the Cruciferæ, Leguminosæ, Umbelliferæ—to attest the validity of his observations. But Linnæus' knowledge was limited, as what mortal's is not. Had he known somewhat more of the natural and distinctive structures of the three great divisions of the vegetable kingdom; or had he adopted, instead of having unaccountably overlooked, the labours of his predecessors, Grew and Ray, his system would have assumed a far more accurate and scientific form. This system of Linnæus had its day, and the tide of observation began to flow again in the current which Ray had, in the preceding century, attempted to move—the natural system was resumed and greatly perfected by Jussieu, De Candolle, Brown, Richard, Endlicher, Lindley, and others.

The leading divisions of the Linnæan system are founded on the flowers, sexual organs, and fruit of plants; while his specific distinctions are taken from the other external parts of the plant, as root, stem, and leaves. He separates the vegetable kingdom into two divisions—*phanerogamic* or flowering plants, and *cryptogamic* or flowerless plants, as lichens, mosses, ferns. To the former division belong twenty-three classes, to the latter one class, making in all twenty-four classes.

The following table exhibits a view of these classes, with a specific example illustrative of each:—

TABLE OF LINNÆAN CLASSES.

Stamens and Pistils existing in every Flower.

A. Stamens unconnected.

a. Stamens of equal or nearly equal length.

Class.		Example.
I.	MONANDRIA.—1 stamen.	Hippuris or mare's-tail.
II.	DIANDRIA.—2 stamens.	Veronica, lilac.
III.	TRIANDRIA.—3 stamens.	Iris, crocus, grasses.
IV.	TETRANDRIA.—4 stamens.	Woodruff, scabious.
V.	PENTANDRIA.—5 stamens.	Potato, carrot, gentian.
VI.	HEXANDRIA.—6 stamens.	Lily, rush, asparagus.
VII.	HEPTANDRIA.—7 stamens.	Trientalis or winter green.
VIII.	OCTANDRIA.—8 stamens.	Heath, maple, knot-grass.
IX.	ENNEANDRIA.—9 stamens.	Flowering-rush.
X.	DECANDRIA.—10 stamens.	Saxifrage, chickweed, pink.
XI.	DODECANDRIA.—12 to 19 stamens.	House-leek, mignonette.
XII.	ICOSANDRIA.—Perigynous, attached to calyx, 20 or more stamens.	Rose, cherry, apple.
XIII.	POLYANDRIA.—Hypogynous, inserted below ovary, 20 or more stamens.	Poppy, anemone.

b. Stamens differing in length.

XIV.	DIDYNAMIA.—2 long and 2 short stamens.	Thyme, lavender.
XV.	TETRADYNAMIA.—4 long and 2 short stamens.	Turnip, radish.

B. Stamens connected.

XVI.	MONADELPHIA.—By their filaments; 1 bunch.	Geranium, mullion.
XVII.	DIADELPHIA.—By their filaments; 2 bunches.	Broom, pea, vetch.
XVIII.	POLYADELPHIA.—By their filaments; 3 or more bunches.	St. John's wort.
XIX.	SYNGENESIA.—By the anthers, Compositæ.	Dandelion, thistle.
XX.	GYNANDRIA.—With pistil on a column.	Orchis, Calceolaria.

Stamens and Pistils in separate Flowers.

XXI.	MONŒCIA.—On the same plant.	Oak, beech, nettle.
XXII.	DIŒCIA.—On separate plants.	Poplar, juniper, yew.

Stamens and Pistils in same or separate Flowers, and in same or separate Plants.

XXIII. Polygamia.—Orache.

Asexual—Flowers not apparent.

XXIV. Cryptogamia.

TABLE OF LINNÆAN ORDERS.

Class.	Order.
I.—XIII.	1. Monogynia.—1 free style.
	2. Digynia.—2 free styles.
	3. Trigynia.—3 free styles.
	4. Tetragynia.—4 free styles.
	5. Pentagynia.—5 free styles.
	6. Hexagynia.—6 free styles.
	7. Heptagynia.—7 free styles.
	8. Octogynia.—8 free styles.
	9. Enneagynia.—9 free styles.
	10. Decagynia.—10 free styles.
	11. Dodecagynia.—12 to 19 free styles.
	12. Polygynia.—20 or more free styles.
	13. Polygynia.—20 or more free styles.

(It must be noticed that each of the first thirteen classes does not contain all of the above orders.)

XIV.—	1. Gymnospermia.—With naked seeds.
,,	— 2. Angiospermia.—Seeds in capsule.
XV.—	1. Siliculosa.—Seeds in a short pod.
,,	— 2. Siliquosa.—Seeds in a long pod.
XVI.	Triandria.—3 stamens.
XVII.	Pentandria.—5 stamens.
XVIII.	Decandria.—10 stamens.
	Polyandria, &c., as in first 13 classes.—Numerous stamens.
XIX.—	1. Polygamia equalis.—Florets all with stamens and pistils.
,,	—2. Polygamia superflua.—Disk florets hermaphrodite; ray female.
,,	—3. Polygamia frustranea.—Disk florets hermaphrodite; ray abortive.
,,	—4. Polygamia necessaria.—Disk florets male; ray female.
,,	—5. Polygamia segregata.—Each flower with separate involucre.
XX.—	Monandria.—1 stamen.
,,	—Diandria.—2 stamens.
	So on, as in first 13 classes.
XXI.	Monandria.—1 stamen.
	Diandria.—2 stamens.
XXII.	Hexandria.—6 stamens.
	Polyandria, &c.—Many stamens.
	Monadelphia.—Stamens monadelphous
XXIII.—	Moncecia.—Monandria. Diandria, &c.
,,	—Dicecia.—Monandria, Diandria, &c.
,,	—Tricecia.—Male, female, and hermaphrodite, on same or different plants.
XXIV.—	1. Filices.—Ferns.
,,	—2. Musci.—Mosses.
,,	—3. Hepaticæ.—Liverworts.
,,	—4. Lichens.
,,	—5. Algæ.—Sea-weeds.
,,	—6. Fungi.—Mushrooms.

Natural System of Classification.—It is evident that one set of organs, as the reproductive, gives but a very partial idea of plants; and that the structure of the elementary tissues, the nutritive organs, and the nature of the products eliminated by these, must all be taken into account in forming a correct scientific estimate of the various kinds of vegetables. It will thus be found, on investigation, that nature has wrought after a certain definite plan; that all the organs of plants bear a certain relation to each other, and that, however diversified the forms, the aspects, and the products of the vegetable kingdom appear to be as a whole, yet that there is a correspondence which prevails in the organic structure and functions of certain groups, which readily admits of well-marked divisions and subdivisions of the numerous specific forms. We have already seen that in the vegetable kingdom there are great and obvious natural distinctions. We cannot examine a sea-weed or a mushroom without perceiving that it is simple in structure and organs—a series of cellular combinations without distinct roots, stem, leaves, or flowering organs: and that it produces its kind, not by a seed, the product of two sexes with an ovule and cotyledon, but by a simple sporule, which is nothing more than a bundle of cells or bud, that, dropping into the soil, springs up into another plant similar to the parent. These fuci, fungi, mosses, and ferns, all resembling each other in general structure, point out the lowest and simplest division of vegetable being. A common grass plant, or a palm, has still the simple cellular structure of the fucus; but in addition it has vascular and spiral vessels, a stem simple and unbranched, long tapering leaves, with parallel veins, and a flower and fruit with one cotyledon, and rootlets springing out sideways from beneath a covering sheath. This structure marks the endogenous monocotyledonous division; and we then mount upwards to the more perfect form of the oak, with its wide branching canopy of arms, its large concentric trunk, the circular elaboration of ages; its oval reticulated leaves, and fruit composed of two cotyledons; and its axial embryo. With these well-marked distinctions of three great divisions, we still find in nature an inherent and favourite tendency to fill up with intermediate forms the gap between, so that her great chain of connected links may be in some measure complete. Between the last two divisions we accordingly find the coniferous and cycadaceous tribes, which in structure are somewhat intermediate; while a more anomalous tribe, the *rhizanths*, a class of stemless fleshy plants, with an imperfect vascular system, resembling mushrooms, have yet two sexes, and produce true seeds, like the flowering plants. It will thus be found that nature baffles all absolute and regular classification, and that the natural method, though satisfactory in its great leading outlines, presents many anomalies, and finds many stragglers on the mountain sides and in the valleys, which it is extremely difficult to range under any known denomination. As a means of simply arranging and cataloguing plants, the natural system is inferior to the sexual method of Linnæus; and the objections raised to the Linnæan system are perhaps more felt and more numerous in the natural than in the other. Yet, as a philosophical exposition of the vegetable kingdom, and as a basis on which to accumulate additional knowledge and research, the natural method infinitely surpasses the more limited range of the great Swedish naturalist. The natural method, in the first place, takes account of the elementary tissues—the *cellular*, of which the simplest forms are composed, as lichens, fuci, mushrooms; the *scalariforms*, or ladder-like vessels, added to the cellular, of which the tree ferns and higher cryptogamic plants are formed; the *spiral* vessels and other forms which enter into the composition of the vascular cotyledonous divisions. Of the nutritive organs, the root, stem, leaves, are all distinctive. Of the reproductive organs, the floral envelopes, their absence, presence, and arrangements, the mode of inflorescence, and above all the cotyledon and the embryo of the seeds, are of the greatest importance. The first founder of a natural system was, as already stated, Ray. After a long interval, Jussieu adopted and enlarged this system, dividing plants into three primary groups: acotyledonous, monocotyledonous, and dicotyledonous; including under the first division one class, under the second three, and under the third eleven. De Candolle adopted the same primary divisions, but considerably enlarged the subdivisions. The latest arrangement of Lindley is as follows:—

Class.	
I.	Thallogens.—Asexual or flowerless plant; as Algæ, Fungi, Lichens.
II.	Acrogens.—Asexual or flowerless plant, with stems and leaves; as Ferns, Tree-ferns

III. Rhizogens.—Sexual or flowering plants, with acotyledonous embryos, and fructification springing from a thallus; as Rafflesia.

IV. Endogens.—Monocotyledonous flowering plants, with endogenous stems, parallel venation, and ternary symmetry; subdivided into—
1. Plants with glumaceous flowers, formed by imbricated bracts; as Grasses, Reeds.
2. Petaloid unisexual flowers; as Palms.
3. Petaloid hermaphrodite flowers, adherent to the ovary; as Narcissus.
4. Petaloid hermaphrodite flowers, free from the ovary; as the Lily.

V. Dictyogens.—Monocotyledonous plants, with reticulated venation; as Dioscoraceæ and Smilaceæ.

VI. Gymnogens.—Polycotyledonous exogens, with naked seeds; as Coniferæ and Cycadaceæ.

VII. Exogens.—Dicotyledonous plants, with seeds in a seed-vessel; subdivided into—
1. *Diclinous*, with unisexual flower; as Amentiferæ.
2. *Hypogynous*, with hermaphrodite or polygamous flowers, and free stamens; as Ranunculaceæ.
3. *Perigynous*, with hermaphrodite or polygamous flowers, and stamens attached to either calyx or corolla; ovary superior, or nearly so; as Rosaceæ.
4. *Epigynous*, with hermaphrodite or polygamous flowers; stamens attached to calyx or corolla; ovary inferior, or nearly so; as Umbelliferæ.

Beginning with the simplest forms, we shall briefly sketch the leading characters of the principal divisions.

I. *Acrogenous, Cryptogamic, Acotyledonous*—summit-growing, flowerless, and wanting a seed-lobe—are all terms expressive of the lowest and simplest class of plants, which commence in the form of one or more simple cells, as the Palmella and Protococcus, or red-snow; or, as the lichens, fuci, and fungi, a mere expansion of cellular ovals, without stem, branches, or leaves. The structure is composed of cellular tissue; the cell little compressed from its spheroidal or oval form, with much intercellular space between, and consequently not exhibiting the hexagonal or cubical form of the cell so common in the higher divisions. Vascular tissue is generally absent, except in the higher classes, where the scalariform or ladder-shaped vessel is found, as in the stem of the tree-fern. The growth and elongation of the plants consist of a simple cellular extension instead of the annular aggregation of circular layers on the surface, so that there is little increase of thickness after the stems are once formed. The stem of the tree-fern produces no branches, and as in the inferior ferns, the fronds correspond to leaves; but they are furnished with no stomata, the venation is either simple or in a forked manner, and the frond before development is rolled or coiled up. There are no sexual organs; the simple mode of reproduction is by sporules or germs, which are produced on the back of the fronds of ferns in spore cases or thecæ, contained in a simple sac, as the urn-like *sporangia* of mosses; but they have nothing in common with the sexual organs of flowering plants. It is supposed, however, that there is a duality of the cells engaged in reproduction, and the one has been called *antheridia*, the other *pistilidia*. The natural orders of this division are ferns, Equisetaceæ, Lycopodiaceæ or club-mosses, Musci or moss plants, Hepaticæ or liverworts, Fungi or mushrooms, lichens, Algæ or seaweeds. In their relations to higher orders of plants, the ferns approach the Cycadaceæ, and the Lycopodiums the Coniferæ or pine tribe, while the Equisetums approach the Casuarinæ. Ferns are extremely abundant in warm moist regions, as in the West India Islands, New Guinea, and Polynesia. They are also natives of temperate and subarctic climes. Nearly 200 genera or families and 2000 species have been enumerated. Ferns are found entering largely into the formation of fossil coal. The existing species are of comparatively little use to man. The tree-ferns of the tropics are graceful plants, the stems rising to 50 and 60 feet in height, and on the summit bearing a plume of minutely divided waving fronds. The mosses are also abundant plants in various climates; in temperate and subarctic regions their slow and imperfect decay forms extensive peat-bogs. The mosses and lichens are the first plants to take possession of a bare, rocky, and newly formed surface, and by their agency a soil is prepared for the reception of plants of higher orders. The Hypnum, Sphagnum, and Bryum are the most common moss plants of Britain. Some lichens, as *Roccella tinctoria* and *Lecanora tartarea*, produce our dyes orchil and cudbear. Fungi are remarkable for their quick growth on various decomposing animal and vegetable substances, and are found at certain seasons everywhere in abundance. The edible fungi contain a large proportion of nitrogen, and in this respect approach nearer to animal matter than any other vegetable products; bread mould, the smut in wheat, and other minute fungi, attack and destroy many plants and their leaves, causing blight, mildew, rust. Unlike other vegetables, fungi will grow in the dark, and will shoot out in all positions, either horizontally or perpendicularly downwards. Sea-weeds produce, from their ashes, kelp, containing soda, and some are mucilaginous, and used as food.

Rhizogens—intermediate between the monocotyledons and the flowerless acrogens—are a curious though small group, resembling in general structure the fungi, but having true sexual flowers with seeds. They are parasitical and leafless plants, with a stem of a homogeneous cellular structure, with a few spiral vessels. The propagation of seeds is by the agency of two sexes, but the seed itself has no embryo—it consists merely of a homogeneous mass like the spores of the cryptogamic plants. Rhizanths are all of a fungous structure, and live as parasites on other plants. Some have the form of mushrooms, some send up a panicle of conspicuous flowers, or the flowers may assume the form of a capitulum; others throw up a flower stem, covered with spawn like that of fungi. Instead of leaves, these parasites have scaly colourless fronds. The *Rafflesia Arnoldi* is one of the most remarkable of these, and perhaps is the largest flower known. It is a native of the island of Sumatra. This gigantic plant, which consists merely of a short stem and the flowering organs, measures 3 feet in diameter. It has a central disk and five rounded petals, each nearly 1 inch in thickness, and of a pinkish hue, spotted with dark red points. In the centre is a projecting ray, within which are the stamens and pistils. The whole plant has a dull fetid smell something like that of a poisonous mushroom. The Balanophoræ are a family of leafless plants, with monœcious flowers, parasitical on the roots of trees, and natives of the mountainous regions of Asia, America, and South Africa.

II. *Endogenous, Phanerogamic Monocotyledons* are plants that shoot up their growing stems from within, furnished with flowers, and producing seeds with one cotyledon. If herbaceous, they have single stems, often hollow, and often knotted or jointed; the leaves are elongated, with parallel veins, and not reticulated, not unfrequently with bulbs or tubers attached to the stem, otherwise the roots are fibrous, springing out at the side of the sheath of the germen. If trees, they are single tapering stems, extending by an upward growth from the top, and increasing little in breadth, with broad leaves proceeding from the terminal stem, seldom divided, and marked with parallel venations. The solid stem consists internally of cellular vessels, among which are bundles of vascular tissue, without any distinction of central pith, medullary rays, or annular concentric circles. The bark or external covering consists merely of a series of condensed

cellular tissue, without distinction of epidermis or inner reticulated liber; and there is no cambium or circle of soft new wood, as in the exogenous stem. The hollow stems of the Gramineæ and other reeds, and the porous stem of the bamboo, are strengthened by an external coating of silex. The leaves frequently form sheathes at the base, and do not readily separate from the stem by an articulation. The leaves are mostly alternate, rarely opposite or in pairs. The flowers generally have a ternary division; sometimes there are distinct calyx and corolla; more frequently a perianth or an envelope intermediate between, and combining the properties of both the other organs. The embryo contains one cotyledon, or when two one is imperfect or only accessory. The radicle is usually inclosed within the substance of the embryo, through which it bursts when germinating. Palms, grains, grasses, sugar-canes, rushes, reeds, the iris, lily, aloe, onion, and many other families, belong to this division. The palms, sugar-cane, bamboo, aloe, and other plants, are natives of tropical climes. The grasses are universally diffused, especially in temperate and subarctic regions, and so are the cerealia, with the exception of rice and maize, which are tropical and sub-tropical. This great division of the vegetable kingdom is characterized by the vegetable products being generally bland amylaceous matter, as starch, sugar, mucilage—more rarely acrid. As Humboldt remarks, acids, bitters, resins, camphor, tannin, acrid milky juices, and poisonous matters, are either wholly wanting or very uncommon. Natives chiefly of warm and temperate climates, they grow up rapidly, and produce their abundant stores of bland starchy or saccharine matters so well suited for the daily food of man and many other animals. The palm tribe is the most magnificent and beautiful of this division. They are all strictly tropical, with the exception of the dwarf-palm (*Chamærops humilis*), which grows in the S. of Europe. The tall single stems of the palm, shooting up to a height of 50 to 150 feet, and bearing a bunch of leaves at the top, some of which are 12 feet long, and of a deep glistening verdure, impart a peculiar character to the scenery of the tropics. Linnæus calls them the princes of the vegetable kingdom, and Humboldt describes the impression of his first beholding their beauty in glowing colours. Nor is their beauty less than their value: they are not only the ornament, but the economic wealth of the tropics, the date, the cocoa-nut, the banana, the wax palm, affording food, oil, drink, cordage, wood, thatch, cups, and various other domestic articles of indispensable use to man. Fortunately, too, they are of easy natural growth, are suited for various soils, and are amazingly productive. A single spathe of the date-palm contains 12,000 flowers, and other palms contain 200,000 flowers in one spathe, or 600,000 in a single tree. Every bunch of the sago-palm of the Orinoco bears 8000 fruit. The *Gramineæ*, or grasses, are universally diffused over the globe, from the extreme limits almost of circumpolar vegetation to the equator. Their families and species are very numerous, amounting nearly to 4000, or about $\frac{1}{15}$ part of known plants. They are generally social plants, a great many growing together—in temperate regions covering the whole surface of the soil, forming the green sward of meadows and valleys, and in America extending over the vast prairie lands. In temperate regions the plants and leaves are of much smaller size than in the tropics, where they assume the appearance of trees, the bamboo rising in bunches containing numerous stems of 50 to 60 feet in height. The sugar-cane and maize plants also attain a considerable height. The seeds of the cerealia are invaluable, as affording the materials of bread, and they are now found in a cultivated state in almost every region of the globe, although we have yet failed to discover them in their natural conditions. The *Ægilops ovata* of Sicily has been adduced as a wild plant from which wheat has been produced by cultivation; but whether it be the original of our domestic wheat, or a degeneration of this plant from its cultivated condition, remains yet to be proved. Rice is an Asiatic grain, and affords the principal food of a large majority of the human race. Maize appears to have been the only cereal of the American continent, and bears an extensive range of climate. Oats and barley thrive best in low temperatures. Wheat is the staple grain of middle and southern Europe, and of the corresponding parallels of Asia and America.

III. *Exogenous Dicotyledons*—outward-growing plants, which increase their stems by concentric circles, and have a seed with two cotyledons—form the most numerous and important division of plants. The structure is made up of cellular tissue and vascular tubes of various kinds, including spirals and laticiferous vessels. The stem has a central medulla or pith, with medullary rays radiating from the centre to the circumference; it is also marked by concentric circles or annular layers of growth, and is covered with a reticulated and fibrous bark, with stomata in the epidermis. The stem is ramified; the leaves are reticulated with branched veins and stomata. The floral envelope consists generally of calyx and corolla, with divisions of five, or multiples of five, or four and its multiples. The seed is either in an ovary or sometimes naked, containing two or more cotyledons. In germinating, the radicle is a simple extension of the central embryo, branching out into rootlets. This division embraces herbaceous plants from the size of an inch up to the giant oaks of the forest, affording products of various kinds, including not only the bland saccharine and amylaceous juices, but gums, resins, essential oils, tar, tannin, narcotine, theine, and various kinds of nitrogenous products.

A subdivision, the *Gymnosperms* or *Gymnogens*, with naked seeds, and a simple uniform arrangement of the vascular tissue, includes the Coniferæ, or pine tribe, and the Cycas family. The Coniferæ, including the fir, larch, cedar, yew, araucaria, are a most important class of forest trees which grow abundantly in the N. of Europe and Asia, and in the elevated mountain zones of America. They yield a valuable wood, and turpentine, tar, and resin. The araucarias, altingias, and lignum vitæ pines form the tallest and most magnificent trees in the world, reaching a height of 200 and even 300 feet.

The oak, elm, beech, and numerous other forest trees belong to the true dicotyledons. Many plants of this division almost rival the cerealia in their domestic utility to man; as the pulses, beans, pease, vetches, the clovers, the carrot, turnip; apple, pear, orange, and other fruits; the cotton plant, tea, coffee, poppy, tobacco plants, a great proportion of our ornamental garden shrubs and flowers; and many of our most potent medicinal plants.

Geographical Distribution of Plants.—In the distribution of plants over the earth's surface, we find two great arrangements prevailing. The first and most obvious is that which is influenced by climate. A certain amount of air, moisture, and heat, as we have seen, is essential to the life of plants—some, however, requiring more and others less of these essentials. A tropical and subtropical temperature of 80° to 86°, with a large amount of atmospherical vapours, is that most favourable to a profuse and luxuriant vegetation. From 50° to 60° is the mean summer temperature of the temperate and subtemperate zones; while the arctic and subarctic regions have a tempera-

ture of 35° to 45°, rising, however, in the summer months, to a maximum of 60° to 70°. Insular climates are always more temperate and more moist than continental localities under the same parallels of latitude, and are thus, on the whole, more favourable to ordinary vegetation. As a general rule, we find that as we proceed from the polar regions to the equator, the amount of vegetation and the varieties of species increase. From the extreme polar borders of vegetation, characterized by the gray lichens on the rocks, moss plants in the dreary moors and marshes, and then saxifrages, gentians, dwarf willows, birches, and other stunted shrubs, we come to the more temperate zone of the Cruciferæ, Umbelliferæ, Labiatæ, Compositæ, and the grasses, with extensive forests of noble pines, and the oak, ash, and other trees. Passing on through the fertile valleys of the vine, and the cerealia and Leguminosæ, the myrtle, orange, and the dwarf-palm, we come at last to the region of the ever-vertical sun, where the broad-leaved palms, the sugar-cane, pine-apple, cotton and coffee plants grow. This forms the horizontal range of vegetation, according to climate; but if we begin to ascend some lofty mountain-range, as the Andes or Himalaya, we find a perpendicular range, also dependent on the gradual diminution of temperature. As we ascend in the atmosphere we thus find at the basis of such tropical mountains the palm and sugar-cane; as we mount higher, the vine, the oak, and the various fruit-bearing trees. Still higher brings us to the regions of pines; these again give place to dwarf birches and rhododendrons, which, in their turn, fade away into mosses and lichens, till at last we come to the snow line of congelation, which puts a stop to vegetable life. Circumstances, which modify this general climatal distribution of plants, must be taken into account; as the nature of the soil—whether calcareous, argillaceous, or siliceous earths predominate; the exposure of the country to the N. or S. or the E. or W. coasts; and the consequent amount of rain-fall, which varies much under various circumstances of locality, and elevation of surfaces, or low continuous level land. Thus, if we take the island of Great Britain, we shall find that the mean annual temperature of the whole E. coast-line is 47° Fahr., and of the W. coast 50°; that the annual amount of rain on the E. coast is 27 inches, while on the W. it is 40 inches, and in the central mountain region, at an elevation of 2000 feet, from 60 to upwards of 100 inches. Mr. H. Watson has divided Great Britain into three climatal regions. 1. *Woody Region*, extending over three-fourths of the whole surface of Britain. In England it embraces all the south-eastern and a large portion of the western parts, the Cumbrian and Welsh mountain-ranges forming an exception. A great part of this region forms undulating plains of meadows, pastures, and corn-fields; the highest wheat fields in England do not exceed 1000 feet, and in Scotland 500 to 800 feet; the upland parts are covered with forest trees, fruit-trees, and shrubbery. 2. The *Barren Region* succeeds the upland, and consists of moors and bleak swamps, with dwarf birch, bog myrtle, juniper, and heaths. 3. The *Alpine Region* forms the summit of the highest land, its sole vegetation being lichens and mosses, and it remains covered with snow for the greater part of the winter.

But we find, in tracing the distribution of plants over the earth's surface, that there exists another system of arrangement, independent of meteorological influences, which may be termed *primary segregation*—a distribution which has relation more to longitude on the globe than latitude. We thus find that there are certain primary centres of peculiar vegetation, which exist even on the same parallels of latitude, and in regions which do not materially differ in respect to perpendicular position, or to soil or meteorological conditions. Thus, within the parallels of 45° to 50°, on the continents of Europe, Asia, and America, we find groups of totally different genera of plants; and the same is the case in South Africa and Australia, while the flora of the Australasian islands differs, again, from that of the Polynesian Archipelago. The countries of Northern Europe and North America lie under the same parallels, and with very similar conditions of soil and climate, yet out of 2800 species of American plants there are only 385 which are found in North Europe. In tropical America, Humboldt and Bonpland found only twenty-four species of plants common to it and any other part of the old world. In Australia, Brown found, out of 4000 species indigenous to that country, only 166 species common to Europe, and most of those were cryptogamic plants. In Asia, notwithstanding the continuous and uninterrupted extension of a continent from E. to W., we find one set of plants in China, another in the countries surrounding the Black Sea and Caspian, and a third on the eastern shores of the Mediterranean. In islands far removed from continents, there are generally a scanty amount of families of plants, and frequently a large proportion of these consists of species which are found nowhere else. In the Canary Isles, out of 530 species, 300 are peculiar to those islands, and the rest are identical with those of the African continent. In St. Helena, the whole flora, with the exception of one or two species, are peculiar to that island. We find, however, in those various regions, at a distance from each other, certain families and species which have their equivalents, that is, species generally resembling though not identical with those of a different locality. Many interesting examples of this kind will be found in Hooker's Antarctic Flora and Himalayan Travels. The lowest forms of plants, as the lichens, mosses, and fuci, have the widest specific dispersion. From the more generally equable medium temperature of the ocean, the fuci are more equally diffused over its surface, but we still find the tropical genera and species differing very considerably from the circumpolar.

The ocean waters have their vegetable zones as well as the land. One great marine zone lies between high and low water mark, containing species which vary somewhat according to the nature of the coast, but which have a general agreement in all the shores of the northern hemisphere. At a depth of from 7 to 15 fathoms lie the zones of Laminariæ and other fuci. From 50 to 100 fathoms constitutes a third zone, inhabited by the lower forms of marine vegetation. The ordinary species of Algæ do not flourish beyond a depth of 50 fathoms. Diatomaceæ exist at great depths in the ocean, and Nullipora and corallines increase as the other Algæ diminish. Beyond a certain range of depth, marine vegetation ceases entirely, neither the temperature, the darkness, nor the distance from the atmospheric air permitting their growth. Fuci abound in the polar regions, and decrease towards the equator. Long narrow beds of *Chorda filum* grow in the northern seas. The *Sargassum bacciferum*, or gulf-weed, occupies the centre of the North Atlantic Sea, and floats over a space of 260,000 square miles. The Laminariæ and Macrocystes, remarkable for their size (the *Macrocystis pyrifera* of the Pacific having been found 500 yards in length), have an extensive range over all latitudes. The red, green, and purple lavers, so common in the British seas, are found at the Falkland Islands, and Lessonias with stem 10 feet in length abound off the Patagonian shores.

The number and relative classes of known plants have been thus estimated:—

	Genera.	Species.
Acotyledons,	1400	15,000
Monocotyledons,	1450	14,000
Dicotyledons,	6300	67,000
	9150	96,000

History of the Science.—The varied beauty and universal prevalence of plants must have early engaged the attention of the curious to inquire into their natures. We have in the very earliest writings abundant allusions to the 'flowers of the field;' and Solomon is said to have written a work on plants; but it is not till the time of Aristotle and his disciple Theophrastus, about 350 years before the Christian era, that we find any philosophical inquiry made regarding the nature of vegetable life, and distinctions drawn between the structure and functions of plants and animals. The knowledge of plants, too, very early became of importance to physicians. Hippocrates points out the medicinal virtues of several plants; and Dioscorides, a physician who flourished at the beginning of the Christian era, wrote a work on botany, in which he enumerates 1200 species, and distinguishes them chiefly on account of their medicinal properties. The Arabian and Persian physicians added some hundreds more to this list of the Greek botanist; but little or nothing was done in the systematic arrangement or contributed to the philosophical knowledge of the structure or functions of vegetables till a much later period. Conrad Gesner, a native of Zürich, born in 1516, was among the first to revive a taste for, and institute new and independent researches into, the nature of plants. It was he who first directed attention to the fructification of plants, and suggested the idea of a classification, founded in reference to the fruit and seed. He was followed by Cæsalpinus, Clusius, Lobelius, Dalechamp, Gerard, and others, whose labours and researches, down to the beginning of the seventeenth century, had increased the number of species to 5500. In the seventeenth century a knot of British botanists—Ray, Willoughby, Grew, Morrison—began to investigate plants on truly philosophical principles. The intimate nature of their structure or 'anatomy,' their various organs and respective functions, and the marked divisions or grades of vegetable being, in relation to structure, complicity of organs, and extent of functions, which distinguished the great chain of the vegetable kingdom, were patiently investigated and pointed out as means of classification and arrangement. To these names must also be added a congenial investigator of vegetable form, the Italian Malpighi. After this period the Fundamenta Botanica of Linnæus appeared, and his system reigned predominant from about 1740 down to the close of the century. His second edition of the Species Plantarum contained 8800 known plants. In the meantime vegetable physiology was cultivated by Bonnet, Du Hamel, Sennebier, Gmelin, Pallas, and in one important department by Hales and Priestley, and other philosophers. The arrangement of the natural system of plants was also revived by Jussieu, and greatly perfected and enlarged by the original investigations and discoveries of De Candolle, Brown, Endlicher, Lindley, Hooker; while the geographical distribution of plants was exhibited as a singular and beautiful series of arrangements existing throughout nature, by the untiring labours of Humboldt, followed by Myen, Schouw, Watson, Forbes, Hooker. Botanical chemistry, founded by Homberg, Dodart, Mariotte, and others—a science so well calculated to throw light on the ultimate composition, and consequently on the food of plants—has been assiduously cultivated by modern chemists, and its results philosophically arranged and exhibited by Liebig, Mulder, and others. The use of the microscope has also greatly extended our knowledge of the minute and distinctive structures of plants. The discoveries of Schwann of the ultimate cell structure of animals was followed up by those of Schleiden, exhibiting a similar structure in plants. The history of the development of the plant from the simple cell, the unity of the building up of the successive symmetrical structure from a central axis, and the production of the various structures and organs from the extension of the same cellular matter, we owe also to this author; with a simplifying of the whole vegetable process, at the same time, with perhaps a rather unsparing use of the pruning-knife to all previous details of physiological botanists. The rapidly extending geographical exploration of the earth's surface, and the facility of transmitting new plants and seeds from all quarters of the world, have also tended greatly to increase the number of known species, and also to enlarge our knowledge of the various structures, the habits, and the acclimation of plants. Of works on British botany those which possess the greatest value are—the new edition of Sowerby's English Botany, edited by T. Boswell Syme, with plates by the Sowerbys and by J. W. Salter (eleven vols. London, 1863–1872); and those of Withering, Hooker, and Bentham, Greville's Cryptogamic Flora, and Harvey's Algæ.

BOTANY BAY, a bay in New South Wales, so called by Captain Cook on account of its profuse vegetation. Cook landed here on his first voyage in 1770, and took possession of the country in the name of his sovereign. The penal settlement, founded in 1788, and popularly known by the name of Botany Bay, was established on Port Jackson, some miles to the northward, where the town of Sydney now stands.

BOTH, JOHN and ANDREW, two Flemish painters, were born at Utrecht, about the year 1610. They were the sons of a glass painter, who instructed them in the rudiments of drawing. They afterwards made further progress in the school of Abraham Bloemaart, and went at an early age together to Italy. John, attracted by the works of Claude Lorraine, chose him for his model; Andrew preferred the painting of the human figure, and imitated the style of Bamboccio. But although their inclinations led them in different directions, their mutual friendship often united their talents in the same works. Thus Andrew painted the figures in the landscapes of his brother; and their labours harmonized so well, that their pictures could not be suspected of coming from different hands. The ease and fine colourings in the beautiful figures of John, cannot be overlooked in spite of the excess of yellow sometimes found in them. His fame has been confirmed by time, and his merit, as well as his residence in Italy, has procured him the name of *Both of Italy*. Andrew was drowned at Venice in 1650. John, inconsolable for his loss, abandoned Italy, and returned to Utrecht, where he died shortly after. The plates which John Both has himself etched from his principal works are much valued.

BOTHNIA, GULF OF, the northern part of the Baltic Sea, which separates Sweden from Finland. It commences at the island of Aland, 60° N. lat., and extends to 66°: its length is about 450 miles, its breadth from 90 to 130, and its depth from 20 to 50 fathoms. It freezes over in the winter, so as to be passed by sledges and carriages. Its water contains only one-third of the proportion of salt found in other sea-water. It abounds in salmon and in seals, which furnish great quantities of train-oil.—This gulf is gradually decreasing in extent.

BOTHRIOCEPHALUS, a genus of cestoid worms which is found very abundantly in the intestines of

predaceous fishes, and one species of which is sometimes found in the intestinal canal of man. It belongs to the same family as the tape-worm (*Tænia solium*), but it is distinguished from it by having its segments broader than they are long; by wanting the four disks which surround the head of the tape-worm, and having in their place two lateral longitudinal openings; and thirdly, by having the sexual organs on one of the flat surfaces of each segment instead of at the edges of the segments. The two longitudinal openings (whence the worm receives its name, from *bothrion*, a little pit, and *kephalē*, the head) do not seem to be organs of nutrition, but merely a kind of suckers by which the worm is enabled to attach itself to the intestines of the animal which it infests, while it is nourished by absorption throughout its whole length. Although, as already stated, this worm generally infests the bodies of predaceous fishes, it is capable of being transmitted to all vertebrate animals, and especially it is found in those birds which live upon fish. The only species which is found in the intestines of man is the *Bothriocephalus latus*, and it is rare to find even this species except among the inhabitants of two distinct parts of Europe, the N. and the centre. It is found, on the one hand, in Russia, in Norway, and in Sweden, and on the other hand, in Switzerland, the N. of Italy, some provinces of Germany, and some departments of France, but rarely elsewhere. It has been remarked that this worm is common where the Tænia or true tape-worm is rare, and *vice versâ*. When either worm has lodged itself in the intestines of the human subject, the means used to expel it are the same in both cases.

BOTHWELL, a village of Scotland, on the N. bank of the Clyde. It is situated 8 miles E. of Glasgow, and about 1 mile beyond it stands Bothwell Bridge, where a decisive battle was fought in 1679 between the Scottish Covenanters, commanded principally by their clergy, and the royal forces, commanded by the Duke of Monmouth, in which the former were totally routed. Near the village are the fine ruins of Bothwell Castle, once a stronghold of the Douglases. Pop. of the parish in 1871, 19,292; of village, 1209.

BOTHWELL, James Hepburn, Earl of, is known in Scottish history by his marriage to Queen Mary. It is supposed by some historians that he was deeply concerned in the murder of the unfortunate Darnley, Mary's husband, and that he was even supported by the queen. He was charged with the crime and tried, but acquitted. After the death of Darnley he seized the queen at Edinburgh, and carrying her a prisoner to Dunbar Castle, prevailed upon her to marry him, after he had divorced his own wife. Though seemingly secure in the possession of power, and though created Earl of Orkney by the unfortunate queen, he soon found that his conduct had roused the indignation of the kingdom. Mary found not in him the fond husband she expected: he became unkind and brutal. A confederacy was formed against him by the barons, the queen was liberated from his power, and he escaped to the Orkneys, and afterwards to Denmark, where he died, 1576. In his last moments, it is said that with an agonizing conscience he confessed his own guilt, and the queen's innocence of the murder of Darnley.

BOTOCUDOS, or Aymores, the name of a Brazilian race of savages, who are remarkably similar in outward appearance to the Chinese. They live 70–90 miles from the Atlantic, in the virgin forests of the coast range (Serra do Mar or Serra dos Aymores), on the borders of the forests of Minas-Geraes and Espirito-Santo, especially on the Rio Doce. They receive their name from the custom which they have of cutting a slit in their under lip and in the lobes of their ears, and inserting in these, by way of ornament, pieces of wood shaped like the bung of a barrel (Portug. *botoque*). They have oblique eyes and projecting cheek-bones. Their colour is a dirty brown. They go quite naked, and paint their bodies, and a Botocudo warrior with his lip and ear plugs, his body painted black and red, and his face bright red, strongly reminds one of a denizen of the infernal regions. They are very skilful with the bow and arrow, and live chiefly by hunting. They number only a few thousands, and are decreasing. They are faithless but bold, and formerly gave considerable trouble at times to the Brazilian government.

BOTRYCHIUM, a genus of ferns of the sub-order Osmundeæ and tribe Ophioglosseæ, characterized by its distinct *thecæ* in a compound spike attached to a pinnate or bipinnate frond. The only native of Great Britain is *B. lunaria*, common moonwort, which grows on elevated heaths and pastures where other ferns are seldom found. It was once supposed to possess great virtues, both magical and medicinal, and was carefully gathered by the light of the moon. *B. virginicum*, the largest of the species, is a native of North America, and is known by the name of rattlesnake fern, from growing in places frequented by that dangerous reptile.

BOTRYTIS, a genus of fungi belonging to the section Hypomycetes, and familiar by name to cultivators from its real or supposed connection with the potato disease. It contains a number of those minute plants known as moulds and mildews, and of these some have the peculiar habit of growing in the tissues of living vegetables. The threads of which their growth consists creep amongst the loose cells of the under side of leaves, and send up their fertile shoots through the stomata. Mr. Berkeley believes that they are first propagated within the plant; but the subject is very obscure. Many kinds of Botrytis are extremely destructive to various plants. Whole crops of onions are soon destroyed by one species; tares and pease suffer from another, but in a less degree; and a third species is sometimes injurious to turnips. The decay of the leaves and stem in the potato disease is certainly due to *B. infestans;* and its appearance in the diseased tissues of the tuber when exposed to the air makes it at least probable that it has a close connection with that destructive murrain. The mould may be traced spreading round the edges of the brown spots on the leaves, and soon destroying the tissue on which it has developed. Though extremely injurious to the cultivator, these moulds are sometimes very serviceable by destroying weeds. Poppies and other agricultural pests may often be seen looking yellow and unhealthy, when an examination of the under side of the leaves will show that this is owing to the ravages of these minute parasites.

BOTTA, Carlo Giuseppe Guglielmo, an Italian statesman, historian, and poet, born at San Giorgio del Canavese in Piedmont, Nov. 6, 1766; died at Paris Aug. 10, 1837. During the time of the French revolution he was a student of medicine at Turin, and adopting revolutionary opinions with enthusiasm, he suffered for his zeal by two years' imprisonment (1792–94). After passing as a physician he entered the French service, and accompanied the expedition which Napoleon sent to Corfu, and he was soon after elected as a member of the provisional government of Piedmont. When this territory was in 1803 annexed to the French Empire, Botta was elected a member of the Corps Législatif, where his behaviour was characterized by a bold opposition to the emperor. During the 'Hundred Days' he was rector of the academy at Nancy, and after the second return of the Bourbons

he went in a like capacity to Rouen. The greater part of the remainder of his life was passed by him as a private gentleman at Paris. His chief works belong to the department of history. Among these are: Storia della Guerra dell' independenza degli Stati Uniti d'America (Paris, 1809); Storia d'Italia dal 1789 al 1814 (ten vols., Paris, 1824). He also furnished a continuation to Guicciardini's Italian History from 1490–1534, bringing it down to 1789.

BOTTA, Paul Emile, son of the preceding, a distinguished French traveller and archæologist, born about the beginning of the present century; died at Poissy in April, 1870. While still very young he made a voyage round the world, traversed the western portion of America, and took part as physician to Mehemed Ali in an expedition which set out from Egypt to Sennaar, of which he took advantage to make a considerable zoological collection. At a later period he was appointed French consul at Alexandria, and from this place he undertook a journey to Arabia in 1837, the scientific results of which he communicated to the world in his Relation d'un Voyage dans l'Yémen. His chief service to science consists in his having discovered the ruins of ancient Nineveh, a discovery made by him in 1843 in the course of excavations in the neighbourhood of Mosul, which he conducted with great energy and ability while acting as consular agent for the French government at that town. Proceeding from the village of Khorsabad, where he made the first discoveries, he succeeded in bringing to light a large number of ancient Assyrian buildings. As the result of investigations made upon the spot he published two important works, one on the cuneiform writing of the Assyrians (Mémoire de l'Écriture Cunéiforme Assyrienne), and the other upon the monuments of Nineveh (Monuments de Ninive, five vols. folio, with drawings by Flandin, Paris, 1846–50); the latter of which is a work of great splendour, and makes an era in Assyrian antiquities. From 1847 to 1857 Botta lived as French consul-general in Jerusalem, and from 1857 to the end of his life in the same capacity at Tripoli.

BOTTARI, Giovanni Gaetano, one of the most learned prelates of the Romish Church during the last century, was born at Florence in 1689; after completing his studies was admitted a member of the academy della Crusca, and intrusted with the preparation of the celebrated dictionary of that body. He laboured for six years on this work, which was published in six vols. folio. The ability which he displayed in it induced the Duke of Tuscany to give him the management of the grand-ducal printing office. He left Florence in 1730 and settled in Rome, where Pope Clement XII. appointed him professor of ecclesiastical history and polemics in the Collegio della Sapienza; the same year he was appointed palatine prelate. Shortly after he was employed with the geometer Manfredi in examining the course of the Tiber from Perugia to the mouth of the Nova, with the view of rendering it navigable, and providing a remedy against its devastating inundations. The excellent report on the subject, though signed by Manfredi, is said to have been drawn up by Bottari. As a compensation for the performance of this task, the pope appointed him keeper of the Vatican library. After living under several popes, who all treated him with favour, he died in 1775 at the advanced age of 86. His works, in addition to those already mentioned, are partly original and partly corrected editions of celebrated writings previously published. Among the former are Lectures on Boccaccio, Livy, and Dante; among the latter is a splendid edition of Virgil, with a learned preface and notes, and a corrected edition of Vasari's Lives of the Painters.

BOTTIGER, Karl August, a versatile German writer, particularly distinguished as an archæologist, born at Reichenbach, in Saxony, June 8, 1760; died at Dresden Nov. 17, 1835. After a philological course at Leipzig, he became in the first place a private tutor at Dresden, and then successively headmaster of a school at Guben, and another at Bautzen. In 1791, through the influence of Herder, he became director of the gymnasium at Weimar, and it was here that, while he enjoyed the society of Goethe, Schiller, Wieland, and other distinguished men, he began his fruitful literary career. In 1804 he removed to Dresden, where he devoted himself exclusively to archæology. Ten years later he was appointed chief inspector of the Museum of Antiquities in that city, where he continued to reside to the end of his life. In 1832 he became a member of the French Institute. Among his most important works are: Sabina, oder Morgenscenen einer reichen Römerin (Sabina, or Morning Scenes of a Wealthy Roman Lady), Leipzig, 1803; Griechische Vasengemälde (Paintings on Greek Vases), Weimar and Magdeburg, 1797–1800; Ideen zur Archæologie der Malerei (Thoughts on the Archæology of Painting), Dresden, 1811; Kunstmythologie (Mythology of Art), Dresden, 1811; Vorlesungen und Aufsätze zur Alterthumskunde (Lectures and Essays on Archæology), Altenburg and Leipzig, 1817; Amalthea (three vols., Leipzig, 1821–25).

BOTTLES, by the ancients, were made of skins and leather; they are now chiefly made of thick glass, of the cheapest kind, and formed of the most ordinary materials. It is composed of sand with lime, and sometimes clay and alkaline ashes of any kind, such as kelp, barilla, or even wood ashes. The green colour is owing partly to the impurities in the ashes, but chiefly to oxide of iron. This glass is strong, hard, and well vitrified. It is less subject to corrosion by acids than flint-glass, and is superior to any cheap material for the purposes to which it is applied.

BOTTOMRY is the hypothecation or pledge of a vessel for the payment of a debt. The creditor has no right to take possession of the ship until the expiration of the time for which the loan is made, and then (under a bottomry contract in the usual form) only by the intervention of an admiralty court. If the loan is not repaid at the stipulated time, the lender applies to an admiralty court, which (the truth of the claim being established) decrees a sale of the ship to satisfy the debt. The conditions of such a contract usually are that, if the ship is not lost or destroyed by those risks which the lender agrees to run, the debt is to become absolute. The risks assumed by the lender are usually the same as are enumerated in a common policy of insurance. If the ship is wholly lost in consequence of these risks, the lender loses his loan. In case of a partial damage, the bottomry bond usually provides that this damage shall be borne by the lender in the proportion of the amount loaned to the value of the ship. If this amount is equal to one-half of the value of the ship, the lender is to bear one-half of the amount of such loss, &c. As the lender thus assumes a certain risk, he is justly entitled to a greater interest than if he did not thus take the hazard of the loss of the whole loan; and this is called *marine interest*. He is entitled to the usual rate of interest on his loan, in addition to the usual premium of insurance for the same voyage or period. The stipulation for such a rate of marine interest is not a violation of the laws against usury, for it is not merely a compensation for the use of the money lent, but also for the risk assumed. The ship-owner may borrow money on bottomry, whether his vessel be in port or at sea. But the captain of the ship, as such, cannot so borrow when

in the port where the owner resides, or near enough to consult him on any emergency. In any other port he may pledge the ship on bottomry for the purpose of raising money necessary for repairing, supplying, and navigating her, if he can obtain it in no other way. If he borrow thus without necessity the bond is void, and the lender can look only to the personal responsibility of the captain.

BOTZEN, or BOLZANO, a town in Austria, Tyrol, 54 miles S. of Innsbruck, at the confluence of the Talfer with the Eisack, near where these fall into the Adige. It is a well-built flourishing town, surrounded by a wall 2 miles in length, and in some places 24 feet thick, built to protect it from a mountain torrent close by. Its situation at the junction of the roads from Switzerland, Germany, and Italy has secured it a share of the trade of these countries, rendering it a thoroughfare for the transit of goods, and making it the first trading town of the Tyrol. The parish church is a Gothic building of the fourteenth century, with an elegant spire; adjoining it is the new cemetery. The other objects worthy of notice are: the church of St. Nicholas, a gymnasium, custom-house, two monasteries, a normal school, and a nunnery. It has some silk and woollen manufactures, tanneries, dye-works, and a printing-office. Botzen is known principally for its four annual fairs, resorted to by commercial travellers from all parts of Italy and Germany. In the environs wine and fruits are produced in abundance, and of excellent quality. The inhabitants of the town are chiefly German, but in the neighbourhood a dialect of the Italian is spoken almost universally. It is thought that the town occupies the site of the ancient Roman citadel *Pons Drusi*. Pop. Dec. 1869, 9357.

BOUCHARDON, EDMUND, the son of a sculptor and architect, was born in 1698 at Chaumont-en-Bassigny, and applied himself early to drawing and painting. He made many copies, without, however, giving up the study of nature. In order to devote himself to statuary he went to Paris, and entered the school of the younger Coustou. He soon gained the highest prize, and was made royal pensioner at Rome. He studied his art partly in the works of antiquity, and partly in those of Raphael and Domenichino. He executed several busts, and was to have erected the tomb of Clement XI., but the orders of the king recalled him to Paris in 1732. Here, among other works, he made a large group in stone, representing an athlete overcoming a bear. This stood for a long time in the garden of Grosbois. Afterwards he assisted in repairing the fountain of Neptune at Versailles. He executed ten statues which adorn the Church of St. Sulpice. A monument to the Duchess of Lauraguais, made by him, is also in that church. The fountain in the Rue de Grenelle, which the city of Paris ordered to be constructed in 1739, was made by him, and is considered his master-piece. A Cupid which he made for the king was unsuccessful. For the *Traité des Pierres gravées* Bouchardon furnished designs from which the plates were copied. The execution of the greatest monument of that period, the equestrian statue of Louis XV., which was erected by order of the city of Paris, was committed to him. He laboured twelve years on this with inconceivable perseverance, and has left in the horse a model which may be ranked with any work of antiquity. He died in 1762. His designs are great and accurate. His pieces bear the character of simple grandeur. He put more spirit and expression into his sketches than into the marble. In general, more fire is to be desired in his sculpture. The paintings which he executed at Rome are bold and powerful. Afterwards he adopted a more polished, delicate manner, to suit the taste of the age. Among his scholars, Louis-Claude Vassé, who died in 1772, is distinguished. Caylus has written his life.

BOUCHER, FRANCIS, painter to the king, and director of the Academy of Painters, was born at Paris in 1703 or 1704, and died in 1770. While a pupil of the celebrated Lemoine, he gained at the age of nineteen the first prize of the Academy. After studying at Rome for a short time he returned to Paris, and was styled the *painter of the graces*—a title which he did not merit. He would, perhaps, have risen to excellence had he not yielded to the corrupt taste of his age, or had he devoted himself more completely to his studies. The ease with which he executed made him careless. His drawing is faulty; his colouring does not harmonize, especially in his naked pieces, which are so glaring that they appear as if the light was reflected on them from a red curtain. In a word, he is looked upon as the corrupter of the French school. He was neither envious nor avaricious, but encouraged younger artists as much as was in his power. The great number of his paintings and sketches show with what rapidity he produced them. The latter alone amounted to more than 10,000. He has also etched some plates, and many of his paintings have been engraved.

BOUCHES-DU-RHÔNE (*Mouths of the Rhone*), a department in the S. of France, in the ancient government of Provence. Chief town, Marseilles. Area 1,267,088 acres, of which about one-half is under cultivation, the remainder being occupied by forests, heaths, wastes, water, &c. Between the Rhone and the lagoon of Berre is the great plain of Crau d'Arles. Its borders are tolerably well cultivated, and support a number of cattle; but the centre is little better than a desert of stones and pebbles, affording, however, winter pasture for sheep. The Rhone is the principal river—near Arles it divides into two branches, which inclose an island called the Isle of Camargues. Several canals facilitate transport, and are especially useful for irrigation. The climate is generally very warm, with little rain during the summer. A cold and generally violent wind, called mistral, always blows from the Cevennes after rain. It lasts from three to nine, sometimes, though rarely, even twelve days, and dries up the ground with astonishing rapidity. The soil of the department is for the most part arid and unproductive, without irrigation. Vines, however, thrive, and almonds, figs, capers, nuts, and particularly olives, are extensively cultivated. The minerals are of little commercial importance. Salt is extensively manufactured from the lagoons, and the salt-works of Berre are celebrated both for the quality and quantity of their produce. The articles manufactured besides salt are principally soap, brandy, olive-oil (the best in France), soda, chemical stuffs, vinegar, scents, leather, glass, &c. The fisheries are numerous and productive. The common language of the people is a compound of Celtic, Greek, and Latin, mingled with Catalan and Italian, and is very expressive. Principal ports—La Vignole, Arles, Martigues, Port de Bouc, Marseilles, Cassis, and La Ciotat. Pop. in May, 1872, 554,911.

BOUDOIR, a small room, simply and gracefully fitted up, destined for retirement (from *bouder*, to pout, to be sulky). It may be indebted for its name to an angry husband, whose wife, when inclined to pout, shut herself up in her chamber. The boudoir is the peculiar property of the lady—her *sanctum sanctorum*. To this she flees for peace and solitude from the bustle of society.

BOUFFLERS, LOUIS FRANÇOIS, DUC DE, Marshal of France, one of the most celebrated generals of his age, was born in 1644; died 1711. He was an *élève*

of the great Condé, of Turenne, Crequi, Luxembourg, and Catinat. His defence of Namur in 1695, and of Lille in 1708, are famous. The siege of the former place was conducted by King William in person, and cost the allies more than 20,000 men. The latter was conducted by Prince Eugene. An order was sent from Louis XIV., signed by his own hand, commanding Boufflers to surrender; but he kept it secret, until all means of defence were exhausted. The retreat of the French after their defeat at Malplaquet, under the direction of Boufflers, was more like a triumph than a defeat.

BOUFFLERS, Stanislaus, Chevalier de, member of the French Academy, son of the Marchioness of Boufflers, mistress of Stanislaus, King of Poland, born at Lunéville, 1737. He entered the army, was soon appointed governor of Senegal, and, while in this office, made many useful regulations. After his return he devoted himself to that light kind of literature which distinguished the age of Louis XV. His reputation gave him a seat in the States-general, where he was esteemed for his moderation and his good intentions. After August 10, 1792, he left France, and met with a friendly reception from Prince Henry of Prussia, at Reinsberg, and Frederick William II. A large grant was made to him in Poland for establishing a colony of French emigrants. In 1800 he returned to Paris, where he devoted himself to literary pursuits, which, in 1804, procured him a seat in the French Institute. He died Jan. 18, 1815. He lies buried near the Abbé Delille, and on his tomb is this inscription, written by himself, and characteristic of his lively disposition: *Mes amis, croyez que je dors.* His works were published in eight vols. 12mo, 1815. His mother was long the ornament of the court of Stanislaus, during its residence at Lunéville, by the graces of her mind and beauty of her person. Voltaire addressed to her a madrigal which finishes thus:

> 'Si vous eussiez vécu du temps de Gabrielle
> Je ne sais pas ce qu'on eût dit de vous,
> Mais on n'aurait point parlé d'elle.'

She died in 1787.

BOUGAINVILLE, Louis Antoine de, Count of the Empire, senator, and member of the Institute in 1796, was born in 1729 at Paris; died at the same place, 1811. At first a lawyer, afterwards a distinguished soldier, diplomatist, and scholar, he was always remarkable for his energy of character. He fought bravely in Canada under the Marquis of Montcalm, and it was principally owing to his exertions, in 1758, that a body of 5000 French withstood successfully a British army of 16,000 men. Towards the conclusion of the battle he received a shot in the head. The governor of Canada, finding himself unable to defend the colony, sent Bougainville to France for reinforcements. He set off in November, 1758, and returned January, 1759, after the king had made him colonel and knight of St. Louis. After the battle of September 13, 1759, in which Montcalm was killed, and the fate of the colony decided, Bougainville returned to France, and served with distinction under Choiseul Stainville, in the campaign of 1761, in Germany. After the peace he entered the navy, and became one of the greatest naval officers in France. He persuaded the inhabitants of St. Malo to fit out an expedition for the purpose of establishing a colony in the Falkland Islands, and undertook the command of the expedition himself. The king appointed him captain, and Bougainville set sail with his little fleet in 1763. But as the Spaniards had a prior claim to the islands, France was obliged to surrender them, and Bougainville having returned to France, was commissioned to carry the surrender into execution on receiving from Spain a remuneration for his expenses. For this purpose he set sail with one frigate and a merchant ship from St. Malo, Dec. 15, 1766. After the immediate object of his voyage was accomplished, he circumnavigated the world and returned to St. Malo, March 16, 1769. He enriched the science of geography by a number of new discoveries. In the American war he commanded several ships of the line with great honour; was in 1779 *chef d'escadre*, and in the following year field-marshal in the land forces. After 1790 he devoted himself to science.

BOUGIES (the French word for tapers), in surgery applied to certain smooth cylindrical rods which are introduced into the canals of the human body in order to widen them, or more rarely to apply medicaments to a particular part in the interior of the body. They are distinguished from catheters by being quite solid, while the latter are hollow and open at the ends for the purpose of affording a passage to fluids. Bougies are generally pointed at one end, and grow gradually thicker towards the other end, but in some cases they are of the same thickness throughout their whole length, the ends being only rounded off. They are made sometimes of linen dipped in wax and then rolled up, sometimes of a kind of plaster and linen, also of caoutchouc or gutta-percha, or of metal, such as lead, silver, or German silver.

BOUGUER, Pierre, born at Croisic, in Brittany, in 1698, studied the elements of mathematics under his father, who was an able hydrographer, and is well known as the author of an excellent Treatise on Navigation. He was soon master of all that his father could teach him, and in 1727 gained a prize proposed by the French Academy for the best essay on the masting of vessels. He gained similar prizes in 1729 and 1731, and added still more to his fame by a work of consummate ability entitled Traité de la Gradation de la Lumière, in which he endeavours to ascertain the quantity of light absorbed by transparent bodies, explains the construction of several ingenious instruments which he had invented for the purpose of facilitating such investigations; and maintains that the light of the sun is more intense at its centre than on the edges of its disc, while in the moon the reverse is the case. About this time the figure of the earth was the subject of frequent discussion in the Academy of Sciences; and for the purpose of ascertaining exactly how much it was elevated at the equator and flattened towards the poles, it was proposed to measure the length of a degree at each of these positions, and at the same time make other observations and experiments of importance to astronomy and navigation. An expedition was accordingly fitted out, in which Bouguer was associated with Godin and La Condamine. The main burden of the task fell upon Bouguer, who executed it with consummate ability, and published the results in a work entitled Théorie de la Figure de la Terre. Unfortunately, he had become suspicious of La Condamine, and had not hesitated to charge him with wishing to appropriate a much larger share of the honour of the work than belonged to him. The general impression is that this charge is not well founded, and Bouguer by making it only involved himself in a quarrel which embittered the latter part of his life, and probably hastened his death, which took place in 1758.

BOUILLÉ, Francis Claude Amour, Marquis de, one of the most celebrated of the generals of Louis XVI., was born in 1739 at Auvergne. He distinguished himself in the Seven Years' war, and was appointed governor of Guadaloupe in 1768, and conquered Dominica, St. Eustatia, Tobago, St. Christopher, Nevis, and Montserrat. After the

Peace of 1783 he returned to Paris, and was appointed lieutenant-general. He afterwards travelled in England, through Holland, and a great part of Germany, until he was made chief of the province Trois-Evêchés. In the Assembly of Notables (1787–88) he declared for the proposed reforms of Calonne, which, however, were defeated by Cardinal Brienne. He was opposed to the plan of Necker for the union of the provinces. At the breaking out of the revolution he supported the existing government, both in his former province and in Lorraine, Alsace, and Franche-Comté. It was only at the urgent desire of the king that he swore allegiance to the constitution of 1791. He repressed in 1790 the rebellion of the garrisons of Metz and Nancy; and although the National Assembly decreed him a vote of thanks for the bravery and ability he had displayed on this occasion, still the revolutionists distrusted him. Shortly afterwards he made preparations to assist Louis XVI. in his escape. Bouillé had made his arrangements well, and had not the king forbidden any bloodshed, he would certainly have rescued him. Being thus compelled to leave the king at Varennes to his fate, he fled from the dangers to which he himself was exposed by the attacks of the revolutionists. From Luxembourg he wrote a threatening letter to the National Assembly, and then exerted himself to excite the foreign powers against the Republic. He succeeded well at Vienna, gained over Gustavus III., and obtained the promise of 30,000 men from the Empress Catharine II., to be put under the command of the King of Sweden and the French general. But Gustavus was murdered, the empress forgot her promises, and Bouillé went over to England in 1796. Here he wrote his Memoirs of the Revolution, which appeared in an English translation (London, 1797), and, after his death, in the original. Bouillé died at London in 1800.

BOUILLON, originally a German duchy, now a large district in Belgium, 9 miles wide and 18 long, on the borders of Luxembourg and Liége. This woody and mountainous tract consists of the town of Bouillon, with 2800 inhabitants, and twenty-one villages, with 18,000 inhabitants. The town was once the capital of the duchy of the same name. This ancient place lies in the midst of hills, on the left bank of the Semois, which abounds with fish, 40 miles from Liége and 18 from Ivoix. It has a strong castle upon a rock, which, however, is commanded by the neighbouring mountains. Godfrey of Bouillon once possessed the dukedom of this name. He was Duke of Lower Lorraine, and Bouillon was bestowed upon him as belonging properly to the county of Ardenne. In order to supply himself with funds for his expedition to the Holy Land, Godfrey mortgaged his duchy of Bouillon in 1095 to the Bishop of Liége. After the estate had been held for many years by the bishopric, the houses of La Marck and La Tour d'Auvergne laid claims to Bouillon, but in 1641 relinquished their pretensions to the Bishop of Liége for 150,000 Brabant guilders. In the war of 1672 France conquered Bouillon, and Louis XIV. gave it in 1678 to the Chevalier La Tour d'Auvergne, his chamberlain. After this time it belonged to the house of La Tour until the revolution, when it was taken from them in 1792. The last possessor, Godfrey Charles Henry de La Tour d'Auvergne, died December, 1812. By the Peace of Paris, in 1814, the dukedom was included in that of Luxembourg, which had fallen to the King of the Netherlands. The title of Prince of Bouillon was assumed in 1792 by Philip d'Auvergne, captain in the British navy, and he continued to bear it till his death in 1816. The congress which met at Vienna in 1815 appointed commissioners to investigate the comparative claims of this nobleman and Prince Charles of Rohan. They decided in favour of the latter. By him it was sold to the Netherlands in 1821, and on the division of the kingdom at the revolution of 1830 it fell to Belgium.

BOUILLON, the name of one of the most distinguished historical families of France. The last Duke of Bouillon of the first line had sold the duchy to the Bishop of Liége, but a new line arose towards the end of the fifteenth century. It originated with a cadet of the house of Marck, which, at the commencement of the fifteenth century, possessed the principality of Sedan. In 1482 William de la Marck, well known by the name of the Boar of Ardennes, seized the territory of Bouillon, belonging to the bishopric of Liége, and conferred it on his brother Robert. The Bishop of Liége attempted by force to regain it, but this Robert, and a son of the same name who succeeded him, were successful in resisting; and at the end of the war, which was brought to a close in 1492 by the mediation of the King of France, Robert the younger remained virtually, if not formally, Lord of Bouillon. The third Robert succeeded his father last mentioned; and having, like his predecessors, entered the service of France, was made prisoner with Francis I. at the battle of Pavia. He afterwards obtained a marshal's baton, and under the name of Marshal de Fleuranges, which was the title he assumed, is known as the author of very curious memoirs. Robert IV., son of Robert III., appears to have been temporarily dispossessed by the Bishop of Liége, but recovered possession, and not only became Marshal of France, but received the title of duke, and thus became the first Duke of Bouillon of the new line. He was taken by the Spaniards at the siege of Hesdin in 1553; and three years after, when he had been liberated on his parole for the purpose of procuring the 60,000 crowns at which his ransom had been fixed, died by poison. His wife was a daughter of the celebrated Diana of Poitiers. His son, Henry Robert, lost Bouillon, which, by the treaty of Château-Cambray, returned to the Bishop of Liége, but he still preserved the title, and transmitted it to his son William Robert, who died in 1588 without having married. The male line thus became extinct. He was survived by a sister, who married Henri de la Tour d'Auvergne, Viscount de Turenne, but died without children in 1594. She had, however, bequeathed her possessions to her husband, and thus the two powerful houses of Turenne and Bouillon were merged into one. This new Duke of Bouillon was one of the most distinguished personages of his time. He was at first devotedly attached to Henry IV. while he was fighting his way to the throne, but afterwards leagued with his enemies; and being implicated in the conspiracy which cost Marshal Biron his life, was long obliged to live in exile. He was restored to favour in 1606, and figured much during the intrigues in the subsequent part of the following reign; and having embraced the doctrines of the Reformed Church, became one of its most distinguished leaders. He died in 1623, leaving two sons, the younger of whom was the celebrated Marshal Turenne. The elder, named Frédéric Maurice, after serving with distinction in the Low Countries, returned to France, became a Roman Catholic, served Louis XIII., then joined the insurrection against him headed by the Count of Soissons, and helped him to gain the battle of Murfée. During the Fronde he joined the princes, and took a prominent part in the civil war, but was reconciled to the court in 1651, obtained the title of prince, and received large accessions of territory in exchange for the principality of Sedan. He died in 1652, leaving interesting memoirs of his life and times. He was succeeded by Godefroi Maurice, who figured much

in the wars of the period, and became great chamberlain to Louis XIV., and who died in 1721. One of his brothers was the celebrated Cardinal de Bouillon, who was born in 1644, obtained the cardinalate when only twenty-six years of age, was long the representative of the Gallican Church at Rome, made himself notorious by his vanity, ambition, and intriguing spirit, and died in 1715.

BOULAINVILLIERS, Henri de, born at Saint Saire in Normandy, in 1658, studied at the College of Juilli, entered the army, but shortly after became devoted to historical and antiquarian pursuits. He wrote a number of works in connection with the history of France, but is perhaps best known by his History of Mohammed, in which he writes in a very oriental style, lauds the impostor, and seems almost disposed to become a believer in the Koran. He is said to have been much addicted to astrology. He died in 1722.

BOULDER CLAY. See Geology—Pliocene Strata.

BOULEVARD (in old French *Boulevart*), a word derived from the German *Bollwerk*, which is the same as the English bulwark. The word was formerly applied to the ramparts of a fortified town, but when these were levelled, and the ditches belonging to them filled up, and the whole planted with trees and laid out as promenades, the name boulevard was still retained, and thus came to have its present signification. The most famous boulevards are those of Paris, especially those which, in the time of Louis XIV., took the place of the fortifications on the N. side of the city, and became first a promenade and then a street. Modern usage has applied the word to many streets which were not originally ramparts, but which have been cut through the older and denser parts of the town, or have been laid out in the new quarters. All that the more modern boulevards have in common with the older ones is that they are broad and are planted with trees. The modern boulevards are for the most part situated at some distance from the bustle of the town, and are therefore less frequented than the older ones, which are in the very heart of the city, and in the neighbourhood of the chief resorts of amusement and pleasure. See Paris.

BOULOGNE, a seaport of France, department Pas de Calais, at the mouth of the Liane; lat. 50° 43′ 33″ N.; lon. 1° 36′ 59″ E. It consists of the upper and lower town; the former is surrounded with lofty walls, and has well-planted ramparts; the latter, which is the business part of the town, has straight and well-built streets, and is semi-English in character, many of the signboards being in English, the shops having an English air, and much English being spoken. The Church of Nôtre Dame (begun in 1827, consecrated in 1866), which has taken the place of the cathedral, has a magnificent high altar, and a crypt, part of which dates from the twelfth century. Among the churches, some of which are handsome edifices, there are several for the English population. The castle, which dates from 1231, is a massive structure, communicating with the upper town by a bridge. It serves at present as a barrack and artillery depôt. Here Louis Napoleon was imprisoned in 1840. Other noteworthy buildings are the Hôtel de Ville, the Palais de Justice, the large and handsome bathing establishments, the library of 33,000 volumes and some very ancient and remarkable manuscripts, the museum of natural history and antiquities, the custom-house, the exchange, and the house in which Le Sage died. Boulogne has manufactories of soap, earthenware, linen, and woollen cloths. Herring and mackerel, large quantities of which are caught off the coast, Champagne and Burgundy wines, coal, corn, butter, linen and woollen stuffs, are the articles of export. Steamboats daily run between this place and England. Boulogne still exhibits some Roman remains. The Northmen took it in 882, and massacred the inhabitants. In 1544 the town was taken by Henry VIII. of England, after a siege of six weeks. The English retained it till 1550, when Edward VI. sold it to France for 400,000 crowns. The Emperor Charles V. demolished it in 1553. During the first republic Boulogne received the name of Port de l'Union. With a favourable wind vessels can reach the coast of England in two or three hours from this place. Bonaparte, therefore, ordered the harbour to be made deeper, and a number of vessels to be built, in order to transport the army intended for the invasion of England, and some small forts and batteries to be erected, in order to strengthen the harbour and the town. A large army remained here for many months in a camp, which almost resembled a town, waiting to embark; but, upon the breaking out of hostilities with Austria, 1805, they were called to other places. Pop. 40,251, about a tenth being English.

BOULOGNE, Bois de. See Bois de Boulogne.

BOULTON, Matthew, a celebrated engineer, was born at Birmingham in 1728. After being educated at a grammar school, he was instructed in drawing by Worlidge, and he also studied mathematics. He engaged in business as a manufacturer of hardware, and, as early as 1745, he is said to have invented and brought to great perfection inlaid steel buckles, buttons, watch-chains, &c., of which large quantities were exported to France, whence they were repurchased with avidity by the British, as 'the offspring of French ingenuity.' In 1762 Boulton finding his manufactory at Birmingham too confined for his purposes, purchased a lease of the Soho, about 2 miles distant, in the county of Stafford. This spot, then a barren heath, was gradually converted into an extensive manufactory and school of the mechanical arts, where ingenious men found ample employment for their talents from the liberal patronage of the patriotic proprietor. The introduction of that important machine, the steam-engine, at Soho, led to a connection between Boulton and James Watt, of Glasgow, who became partners in trade in 1769. He died at Soho, Aug. 17, 1809.

BOUNTY, in political economy, is a reward or premium granted to particular species of trade or production. The general subject of encouragement of domestic, in competition with foreign, industry or trade (which is one species of industry), will be treated of under other heads, and only those circumstances mentioned, in this place, which distinguish bounties from other species of encouragement. And it is to be observed, in the first place, that the general principle is the same, whether the encouragement is given to a particular species of education, as that in the clerical profession, which has been the subject of encouragement, direct or indirect, time immemorial; or education in general; or a particular kind of literary productions, as the best poetical composition; or a treatise on some scientific subject, as one on light and heat; or to some agricultural or manufactured product, as in the case of the premiums formerly granted by England on the exportation of wheat, and those given by agricultural societies in America, for the greatest production of any kind of grain on a given extent of land, or the best threshing or winnowing machine, &c. In all these instances, the general doctrine is assumed and presupposed, that the successful direction of talent or industry to the species of art or mode of production indicated will be beneficial to the public. The utility of the bounty will depend upon the correctness of this assumption.

All bounties or premiums are not offered for the encouragement of domestic talent and industry to the exclusion of foreign competition. Many of those offered by the British and French governments, and by private associations, are held out to all competitors indiscriminately; and where the object is universal improvement, this is one of the appropriate modes of encouragement, though others concur with it, such as the monopolies of copyrights and patents, and the honours and distinctions conferred on those who make any important improvement. One other class of cases may, properly enough, be made the subjects of bounties or premiums; namely, the productions of extraordinary efforts of ingenuity and skill. A competition is in this way excited, by which none suffers, and all the effects of which are beneficial to a community. There is one other class of cases in which nations have offered bounties; namely, to species of industry in the prosecution of which the national security is supposed to be, in some measure, involved. The support of the British navy, for instance, was supposed to depend, in some degree, upon the fisheries, since these were considered to be one of the great schools of seamen. The British government was therefore induced to encourage this species of industry by the offer of liberal bounties. This idea has proved, however, to be an utter fallacy. The generality of the boats employed in the herring-fishery during the existence of the bounty system, instead of being manned by regular fishermen, were, for the most part, composed of small farmers, tradesmen, and others, whom the temptation of the bounty thus allured from their regular occupations to follow what was little better than a gambling speculation. Bounties are a more expensive mode of encouragement than duties and prohibitions, as the money must be first collected by a tax, and then distributed in bounties—a process in which a loss of from two to twenty per cent. is sustained. Of the inutility of bounties in general, the British government has long been persuaded. The bounty on the exportation of corn was repealed in 1815; and the bounties on the exportation of linen, &c., along with the bounty on herrings, ceased in 1830.

BOUNTY, a premium offered by government to induce men to enlist in the public service, especially, the sum of money given in some states to recruits in the army and navy. This system is, of course, only practised in those countries where military or naval service is voluntary, such as our own country or America. The amount of the bounty offered varies with the difficulty of procuring volunteers, and is naturally at its lowest in time of peace. The highest bounty offered in our own country was during the time of the wars with Napoleon, when it rose to about £24. During the late civil war in America the bounty was at one time so high as $500 (£100). The policy of giving bounties is by many thought to be a very questionable one. In our own army it had the tendency of inducing men to desert, in order to enlist again in other regiments, and thus receive new bounties. In the navy, too, as it tends to increase the wages of seamen in the mercantile marine, its operation is considered injurious. The bounty given to army recruits in Great Britain was abolished by the Army Enlistment Act of 1870.

BOUQUETIN. See IBEX.

BOURBON. The founder of this family, which has governed France, Spain, the Two Sicilies, Lucca, and Parma (which see), was Robert the Strong, who, in 861, became Duke of Neustria, and in 866 lost his life in a battle against the Normans. Some trace his descent from Pepin l'Heristal, others from a natural son of Charlemagne, and others from the kings of Lombardy. It is certain that the two sons of this Robert were kings of France. The elder, named Eudes, ascended the throne in 888, and died in 898; the younger, Robert, in 922, and died in 923. The eldest son of this Robert was Hugh the Great, duke of the Isle of France, and count of Paris and Orleans. Hugh Capet, son of Hugh the Great (great grandson of Robert the Strong), founded the third French dynasty in 987. (See CAPET.) One of his descendants, named Robert, was the root of the elder line of the dukes of Burgundy, which became extinct in 1361. A descendant of this Robert, Henry of Burgundy, was first regent of Portugal in 1095, where his legitimate descendants became extinct in 1383. Pierre de Courtenay, a descendant of Hugh Capet, in the fifth generation, was father and ancestor of many emperors of Constantinople. The house of Anjou, which was descended from Hugh Capet, in the eighth generation, possessed the throne of Naples for two centuries, and for some time that of Hungary. Another descendant of Hugh Capet, in the tenth degree, founded the house of Navarre, which continued from 1328 to 1425. A second family of Anjou, descended from Hugh Capet, in the thirteenth degree, gave some distinguished princes to Provence. In the same degree, the younger line of the powerful dukes of Burgundy derived its origin from him. This line became extinct with the death of Charles the Bold, in 1477, whose successor, Maria, married Maximilian, archduke of Austria, and became grandmother of Charles V. Robert, earl of Clermont, second son of St. Louis, married Beatrice, duchess of Bourbon. In this way the city of Bourbon l'Archambault, or Bourbon les Bains, in the department of Allier (formerly *Bourbonnais*), became the birthplace of the house of Bourbon, and Louis I., duke of Bourbon, son of Robert and Beatrice, its founder. Two branches took their origin from the two sons of this Louis, duke of Bourbon, who died in 1341. The elder line was that of the dukes of Bourbon, which became extinct at the death of the Constable of Bourbon in 1527, in the assault of the city of Rome. The younger was that of the counts of La Marche, afterwards counts and dukes of Vendôme. Of these, Charles, duke of Vendôme, who died in 1537, and who had been the head of the house of Bourbon since the death of the Constable, had two sons, Anthony and Louis, founders respectively of the royal line of Bourbon, and of the line of Condé. Henry, the son of Anthony, obtained the throne of France as Henry IV. (see HENRY IV. of France), when the house of Valois became extinct in 1589 by the murder of Henry III. His father had obtained the kingdom of Navarre through his wife, who inherited it, and Henry now added it to the French dominions. Anthony's younger brother, Louis, prince of Condé, was the founder of the line of Condé. There were, therefore, two chief branches of the Bourbons—the royal, and that of Condé. The royal branch was divided by the two sons of Louis XIII., the elder of whom, Louis XIV., continued the chief branch, which, through his son Louis (the dauphin) and grandson Philip V., was separated into the elder or royal French branch, and the younger or royal Spanish branch; whilst Philip, younger son of Louis XIII., founded the house of Orleans, when he received the duchy of Orleans from Louis XIV. The kings of the elder or French line of the house of Bourbon run in this way:—Henry IV. Louis XIII. XIV. XV. XVI. XVII. XVIII., and Charles X.—The house of Bourbon consists of the following branches and members:—

A. The elder French royal line of Bourbons as distinguished from the younger branch or house of Orleans. The last sovereigns of this line were the three brothers, Louis XVI., Louis XVIII., and

Charles X. (Louis XVII., son of Louis XVI., never obtained the crown), all of whom were grandsons of Louis XV. Louis XVIII. had no children, but Charles X. had two sons, viz. Louis Antoine de Bourbon, duke of Angoulême, who was dauphin till the revolution of 1830, and died without issue in 1844, and Charles Ferdinand, duke of Berry, who died, 14th Feb. 1820, of a wound given him by a political fanatic. The Duke of Berry had two children, (1) Louise Marie Thérèse, called Mademoiselle d'Artois, and afterwards by marriage Duchess of Parma, died at Venice 1st Feb. 1864; and (2) Henri Charles Ferdinand Marie Dieudonné, born in 1820, and at first called Duke of Bordeaux, but now called Count de Chambord. His mother was the Princess Caroline, daughter of Francis I., king of the Two Sicilies. Charles X. having abdicated in favour of his grandson Henri above mentioned in 1830, and the dauphin having renounced his claims on the French throne also in favour of the latter, the Count de Chambord is now looked upon by his party as the legitimate heir to the crown of France, and is styled by them Henri V.

B. The branch of the Bourbons known as the House of Orleans. This branch, which was raised to the throne of France by the revolution of 1830, and deprived of it by that of 1848, derives its origin, as already mentioned, from Duke Philip I. of Orleans (died 1701), second son of Louis XIII., and only brother of Louis XIV. By his second wife, Charlotte of the Palatinate, he left as his successor in the dukedom his son Philip, who was known as Duke of Chartres during his father's lifetime, and was regent of France during the minority of Louis XV. Philip, second duke, was succeeded by his son Louis Philip (born 1703), who married a princess of Baden, and died in retirement in 1752, leaving a son of the same name, Louis Philip, duke of Orleans, who was born in 1725, and died in 1785. The son of the last-mentioned duke was Louis Joseph Philip, the duke of Orleans whose name figures in the first French revolution, who perished on the scaffold in 1793, after he had laid aside his princely name the year before and assumed that of 'Citizen Égalité.' He left four children: 1, Louis Philip, before the revolution duke of Chartres, after his father's death duke of Orleans, from 1830 to 1848 king of France, died 26th Aug. 1850, leaving a numerous family; 2, The Duke of Montpensier, who died in England in 1807; 3, The Count de Beaujolais, who died at Malta in 1808; and 4, a daughter, Adelaide, Mademoiselle d'Orleans, born in 1777, died 31st Dec. 1847. The eldest son of King Louis Philip was Ferdinand, duke of Orleans, born in 1810, died in 1842, who married a daughter of Frederick Louis of Mecklenburg-Schwerin, and left two sons: 1, Louis Philip, count de Paris, born at Paris 24th Aug. 1838; and 2, Robert, duke of Chartres, born at Paris in 1840. Louis Philip having abdicated in favour of the former in 1848, the Count de Paris is accordingly looked upon by the Orleanist party as the true heir to the throne of France. He is married to his cousin Isabella, a daughter of the Duke of Montpensier, and has issue.

C. The Spanish-Bourbon dynasty. In 1700 Louis XIV. placed his grandson Philip, duke of Anjou, on the Spanish throne, who as Philip V. founded the Bourbon dynasty in Spain. Philip V. was succeeded in 1746 by his son Ferdinand VI., who, dying in 1759 without heirs, was succeeded by his brother Charles III. To him succeeded (1788) his son Charles IV., who, in 1808, resigned the throne in favour of a successor nominated by Napoleon, and died at Naples in 1819. His son Fernando, prince of the Asturias, obtained the crown on the fall of Napoleon, and reigned as Ferdinand VII., dying on 29th Sept. 1833, and leaving behind him two daughters by his third marriage, the elder of whom succeeded him as Isabella II., the Salic law being set aside in her favour. She was married, in 1846, to her cousin Francisco de Assis. In 1868 she had to leave Spain in consequence of the revolution, and on 25th June, 1870, she renounced her claims to the throne of Spain in favour of her son Alphonso, prince of the Asturias, born 28th Nov. 1857.

D. The royal line of the Two Sicilies. The Two Sicilies being then a possession of the Spanish monarchy, in 1735 Don Carlos, the younger son of Philip V. of Spain, obtained the crown and reigned over Sicily and Naples as Charles III. In 1759, however, he succeeded his brother Ferdinand VI. on the Spanish throne, when he transferred the Two Sicilies to his third son Fernando (Ferdinand IV.), on the express condition that this crown should not be again united with Spain. Ferdinand IV. had to leave Naples in 1806; but after the fall of Napoleon he again became king of both Sicilies under the title of Ferdinand I. He was succeeded by his son Francis I. in 1825; Francis was succeeded by his son Ferdinand II. in 1830; and the latter was succeeded by his son Francis II. in 1859, who was deprived of the kingdom in 1860.

E. The ducal line of Parma. This line, like that of the Two Sicilies, was founded by a son of Philip V. of Spain, viz. Don Philip, his youngest son, who obtained the duchies of Parma and Piacenza in 1748. Louis, grandson of Don Philip, obtained Tuscany likewise (1802), with the title of King of Etruria. The family did not long retain this honour, however, being soon forced by the power of France to give up not only Etruria, but also Parma and Piacenza; and it was not till 1847 that there was again a Bourbon Duke of Parma. In 1859 the present duke, Robert, had to leave his dominions, which were soon incorporated in the kingdom of Italy. See Histoire du Bourbonnais et des Bourbons, by Coiffier Demoret (Paris, 1824), two vols.; and Achaintre's Histoire Chronologique et Généologique de la Maison Royale de Bourbon (Paris, 1825–26), two vols.

BOURBON, CHARLES, DUKE OF, or CONSTABLE OF BOURBON, son of Gilbert, count of Montpensier, and Clara of Gonzaga, was born in 1489; received from Francis I., in the twenty-sixth year of his age, the sword of Constable. By the coolness with which he faced death in posts of the greatest hazard he excited the admiration of his fellow-soldiers. When viceroy of Milan he won all hearts by his frankness and affability. His fame was not yet tarnished when the injustice of his king deprived him of his offices, banished him from France, and brought the family of Bourbon into disgrace, in which state it continued until the conclusion of the reign of Henry III. Some historians declare that the Duchess of Angoulême, mother of Francis I., had fallen in love with the young constable, and could not endure the contempt with which he treated her passion: others relate that, influenced by avaricious motives, she laid claim to the estates of Charles of Bourbon, and obtained possession of them by a judicial process. Whatever may be the true cause of her conduct, it is certain that she strove to invalidate a formal donation of Louis XII. The constable, enraged at seeing himself deprived of his estates by the mother of the king whom he had served with so much fidelity and zeal, listened to the proposals made him by Charles V. and the King of England. He experienced the usual fate of deserters: he was well received while his services were needed, but narrowly watched to secure his fidelity. Exposed as he was to the contempt of the Spanish nobility and the jealousy of the generals of Charles V., nothing remained to him but his courage and repentance. His ability, how-

ever, induced the emperor to bestow upon him the command of an army, and to treat him with honour. He was already beyond the confines of France, when Francis I. sent to demand the sword which he bore as constable, and the badge of his order. His answer displays the anguish of his heart—'The king took from me my sword at Valenciennes, when he gave to D'Alençon the command of the vanguard, which belonged to me: the badge of my order I left under my pillow at Chantelles.' His flight was a misfortune to France; the expedition of Francis into Italy was arrested. Having been appointed to the command of the imperial troops, he made an unsuccessful attack upon Marseilles, but contributed greatly to the victory of Pavia. When Francis was carried a prisoner to Madrid he went there in person, that he might not be forgotten in the treaties between the two monarchs; but Charles V. delayed concluding them, and Bourbon discovered that he could not trust the emperor, who had even promised him his sister in marriage. Compelled to smother his resentment he returned to Milan, maintained possession of Italy by the terror of his arms, and obtained so much authority as to become an object of suspicion to the emperor, who, in order to weaken him, refused to grant him the necessary supplies. In order to prevent the dispersion of his army he led the soldiers to the siege of Rome, the plunder of which city he promised them. He was the first to mount the breach, and was killed, May 6, 1527, by a ball, shot, it is said, by Benvenuto Cellini. He died excommunicated, without issue, in the thirty-eighth year of his age. His body being conveyed to Gaeta, his soldiers erected over it a splendid monument, which was afterwards destroyed.

BOURBON, Louis, Cardinal and Archbishop of Toledo, born 1777, son of the infant Louis, brother of King Charles III. of Spain, and the Duchess of Chinchon. The marriage was concluded with the royal assent: nevertheless, it was doubted, after the death of Charles III., whether the prince would be lawful heir to the throne, if a male descendant of the old line should be wanting. He therefore entered the church, and a cardinal's hat was given to him in 1800. After the imprisonment of Ferdinand VII. at Valençay, he joined the party of the Cortes, and became very influential. He offered in 1814 the constitution of the Cortes to Ferdinand VII. for his signature; and the king having altered his determination, Bourbon lost his favour and was deprived of the archbishopric of Seville. After the events which took place on the insurrection of the army at the island of Leon, he engaged in the revolution, and was president of the provisional junta before which the king swore, at Madrid, March 9, 1820, to abide by the constitution of the Cortes of 1812. He died March 19, 1823.

BOURBON, Isle of, situated in the Indian Ocean, about 400 miles E. of Madagascar; lat. 21° S.; lon. 55° 30′ E. It is 45 miles long and 33 broad. It was discovered by Mascarenhas, a Portuguese, in 1545, who called it by his own name. The French took possession of it in 1649, and gave it the name of Bourbon. At different periods of the revolution it was *Réunion* and *Bonaparte*. It was captured by the British in 1810, and restored to France in 1815. The pop. consists of 183,000, among whom are native Africans, Chinese, Coolies, Malays, &c. Its commerce is impeded by the want of good harbours. The principal articles of export are coffee, sugar, vanilla, gums, lichens for dyeing, cotton, hides, &c. Sugar is by far the most valuable export; vanilla comes next. The capital is St. Denis, a pretty town, with about 36,000 inhabitants. The heat is excessive from November to April; the evenings, however, are refreshed by the sea-breezes, and the mornings by the land-breezes. The island is of volcanic origin, and seems to be composed of two enormous volcanic mountains, in one of which the fire is extinct: the other is still in activity. The loftiest summit, Le Piton de Neige, or the Snowy Spike, is about 10,000 feet above the level of the sea.

BOURBONNAIS, a province and government of old France, with the title, first of a county, and afterwards of a duchy, lying between the Nivernais, Berry, and Burgundy. It now forms the department of the Allier. It derived its name from the small town of Bourbon l'Archambault, from which the Bourbon family received their title. See Bourbon.

BOURBON-VENDÉE, or Napoléon-Vendée, a town, France, capital of the department Vendée, 231 miles S.W. from Paris, agreeably situated on a hill on the right bank of the Yon. The streets are broad, straight, clean, and lined with good-looking houses, and nearly all end in a spacious square, which is bordered with ranges of fine trees, and surrounded by public monuments and elegant mansions. The parish church, with a peristyle of six Doric columns, and the mairie or mansion-house, an elegant Italian building, are both in the square. Besides these there are an elegant market-house, theatre, and extensive public offices, large barracks, and a small public library. It was founded by Napoleon I. on the site of the ancient castle of Roche-sur-Yon, destroyed at the revolution, and received the name of Napoléon-Vendée, which was changed to Bourbon-Vendée at the restoration. On the accession of Louis Napoleon its original name was restored. Pop. 8710.

BOURDALOUE, Louis, the reformer of the pulpit, and founder of genuine pulpit eloquence in France, was born at Bourges in 1632, and was sixteen years old when he entered the society of Jesuits. His instructors successively intrusted to him the chairs of polite letters, rhetoric, philosophy, and moral theology. In 1669 he entered the pulpit, and extended his reputation by attacking, with a powerful and religious eloquence, free from the bad taste of the age, the passions, vices, and errors of mankind. The dignity of his delivery, and the fire of his language, made him distinguished, amidst the victories of Turenne and the feasts of Versailles, among the master-spirits of the arts and of literature in the time of Corneille and Racine. Louis XIV. invited him, at the time of Advent, in 1670, to preach before the court, and Bourdaloue acquitted himself with so much success that he afterwards received invitations at ten different times. After the repeal of the Edict of Nantes, he was sent to Languedoc, in order to explain to the Protestants the doctrines of the Catholic faith, and he succeeded in this difficult business in reconciling the dignity of his office with the rights of mankind. In his latter days he renounced the pulpit, and devoted himself to the care of hospitals, prisons, and religious institutions. He well knew how to accommodate his manner to the capacity of those to whom he gave instruction, advice, or consolation. With the simple, he was simple; with the learned, he was a scholar; with free-thinkers, he was a logician; and came off successful in all those contests in which the love of his neighbour, religious zeal, and the duties of his office, involved him. Beloved alike by all, he exercised authority over the minds of all; and no consideration could make him give up his openness and integrity of character. He died in 1704. His sermons have been translated into several languages.

BOURDON, Sebastian, a celebrated French painter, born at Montpellier in 1616. Being poor and without occupation, he enlisted as a soldier. After

receiving his dismission, he visited Italy, and studied under Sacchi and Claude Lorraine. In 1652 he was driven from the French kingdom by the religious troubles, when he was appointed first painter to Queen Christina of Sweden. He afterwards became distinguished in his own country by many great works, among which are the following:—the Dead Christ, the Adulteress, the Old Kings of Burgundy in the Senate-house at Aix. He had no peculiar manner, but he imitated others. He was a good engraver on copper. He died in 1671, while engaged in painting the ceiling of the Tuileries.

BOURGELAT, CLAUDE, founder of the veterinary schools, and creator of the art of veterinary surgery in France, born at Lyon in 1712; died Jan. 3, 1779. He established the first veterinary school in his native town in 1762, and by his works on the veterinary art he furnished the world with a complete course of instruction both in its theory and in its practice. They are: Traité de Cavalerie (Lausanne, 1747); Nouveaux Principes sur la Connaissance et sur la Médecine des Chevaux (Lyon, 1750–52); Éléments de l'Art Vétérinaire (Lyon, 1765); and Traité de la Conformation Extérieure du Cheval (1776).

BOURG-EN-BRESSE (anciently *Burgus Segusianorum*), a town, France, capital of the department of Ain, 232 miles S.E. Paris, left bank Reyssouse. It is well built, with good streets, tolerably clean, and ornamented with public fountains, one of which, in the form of a pyramid, was erected by the inhabitants to the memory of General Joubert. On the Promenade du Bastion is a bronze statue of Bichat, the celebrated anatomist, who pursued his early medical studies in the hospital here. Bourg-en-Bresse has a parish church, a handsome edifice of the sixteenth century; a public library, containing 19,000 volumes; a museum, and a spacious corn-market. Outside the town is a magnificent hospital, surrounded by gardens; and the beautiful Gothic church of Biou, built by the direction of Margaret of Austria, daughter of Maximilian I. In front of the portal stands a curious elliptical sun-dial, reconstructed by the celebrated astronomer Lalande, who was a native of this place. Bourg-en-Bresse is the seat of a court of first resort, and has also a lyceum, seminary, and agricultural society; some manufactures of linen and hosiery, several tanneries, and a cotton mill; and a considerable trade in grain, poultry, wine, leather, horses, and cattle. Pop. 13,733.

BOURGEOISIE, a name applied to a certain class in France, in contradistinction to the nobility and clergy as well as to the working-classes. It thus includes all those who do not belong to the nobility or clergy, and yet occupy an independent position—merchants, ordinary tradesmen, independent artisans, artists, lawyers, &c. In the early period of the middle ages this class was much oppressed, and as a consequence of that it was poor and possessed little culture and refinement. In subsequent centuries it succeeded in raising itself in all these respects, and through the French revolution it attained a position of political equality with the nobility and clergy, and came to be spoken of as the 'third estate' (*tiers état*). The word is now used in a somewhat vaguer sense than formerly, and may be taken to correspond pretty much with our equally vague appellation the 'middle classes.'

BOURGES, an ancient city of France, capital of the department of Cher, situated at the confluence of the Auron and Yèvre, 124 miles S. of Paris. It is surrounded with ramparts, now laid out as promenades, and has crooked and gloomy streets, and houses built in the old style. The most noteworthy buildings are: the cathedral, erected in the thirteenth century, and esteemed one of the finest Gothic structures in France; the churches of Nôtre Dame and St. Bonnet; the archiepiscopal palace; the Palais de Justice, a building in the florid Gothic style; and the Hôtel l'Allemant, a chef-d'œuvre of the Renaissance. Bourges has a lyceum, a normal school, a public library, a museum, a general hospital, &c. In the time of Julius Cæsar, who took the town in B.C. 52, Bourges was called *Avaricum;* it was afterwards named *Bituricæ*. In the middle ages it was capital of the province of Berri. The great fire of 1487, which destroyed 3000 houses, gave its prosperity a blow which it never recovered. Pop. 30,119.

BOURGOGNE. See BURGUNDY.

BOURIGNON, ANTOINETTE, a celebrated religious fanatic, was the daughter of a merchant; born in 1616, at Lille; died at Franeker in 1680. At her birth she was so deformed that a consultation was held whether it would not be proper to destroy her as a monster. She made herself famous by her restless manner of life, her wanderings through France, Germany, and Denmark, and by her fanaticism. A collection of her authentic works, in which she displays an animated eloquence, was published at Amsterdam in 1686, in twenty-one vols.

BOURMONT, LOUIS AUGUSTE VICTOR DE GHAISUE, COMTE DE, Marshal of France, born September 2, 1773, at the castle of Bourmont, in Anjou; died there October 27, 1846. At an early age he took part in the campaign in La Vendée, at a later period entered the Republican army, and was advanced by Napoleon, under whom he had distinguished himself at Dresden and Nogent, to the rank of general of division. Although he had gone over to the Bourbons in March, 1814, Napoleon, on his return from Elba, gave him a command, which, however, Bourmont resigned before the battle of Ligny, in order to go over to the side of the allies. Some years after, as commander of the Spanish army of intervention, he obtained some brilliant successes. His greatest success was the conquest of Algiers, which procured him a marshal's staff in 1830. After the revolution of July, in 1830, he followed the banished dynasty into exile. In 1833 Dom Miguel, king of Portugal, placed him at the head of his troops which were to act against the adherents of Dom Pedro; but he was unsuccessful. He afterwards sought to act in the interest of the Carlists in Spain, and when he at last returned to his native country he found that he had almost entirely lost his popularity, and accordingly retired for the rest of his life to his estate in Anjou.

BOURNE, a town of England, in the county of Lincoln, and 33 miles S. from the town of Lincoln. The town lies at the foot of a range of hills, and consists of four principal streets, recently much improved in cleanliness and sewage; houses generally of brick, for the most part irregularly but well built; amply supplied with water and well lighted with gas. The church is a large ancient structure, with two towers at its W. end. There are various Dissenting chapels, National and other schools, a mechanics' institute, and a trade in wool and corn. Pop. 3098 in 1871.

BOURNE, VINCENT, an English scholar, distinguished for the beauty of his Latin poems, born probably before the end of the seventeenth century; died December 2, 1747. In 1710 he became king's scholar in Westminster School, from which he proceeded to Trinity College, Cambridge. Here he graduated as B.A. in 1717, and as M.A. in 1721. On leaving Cambridge, where he was successful in obtaining a fellowship, he became usher in Westminster School, in which position he remained, so far as is known, to the end of his life. The poems of Vincent Bourne consist of a considerable number of original Latin elegiacs, and of some translations of short English poems into Latin, which are as remarkable for

their fidelity to the original as for the correctness and beauty of the Latin into which they are rendered. He is also the author of a few epitaphs in Latin and English. An edition of his works with the title Poemata was published 1734.

BOURNOUSE. See BURNOOSE.

BOURRIENNE, FAUVELET DE, a French diplomatist, was born at Sens on 9th July, 1769, and educated along with Bonaparte at the school of Brienne, where a close intimacy sprang up between them. On their separation in 1785, when Bonaparte set out to attend the École Militaire in Paris, they vowed an eternal friendship. At the age of nineteen he proceeded to one of the German universities, with the view of studying law and languages. He returned to Paris in 1792, and renewed his early friendship with Bonaparte, who did him good service subsequently in getting his name erased from the list of emigrants. He also employed Bourrienne in drawing up, along with General Clarke, the text of the Treaty of Campo Formio. From this period Bourrienne's diplomatic career commenced, accompanying Bonaparte as his private secretary on his expedition to Egypt, and afterwards continuing in that capacity on his elevation to the consulate. In 1804 he was nominated by the emperor his minister-plenipotentiary at Hamburg. In the end of 1813 he returned to France, where he received the appointment of director of the posts, and in 1814 was made prefect of police. On the abdication of Napoleon he paid his court to Louis XVIII., who, on his restoration, nominated him a minister of state. Being elected on several occasions a member of the chamber of deputies, he occupied one of the seats on the right. The revolution of July, 1830, and the loss of his private fortune, which took place at the same time, affected him so much that he lost his reason. He was removed to Normandy, and spent the last two years of his life in a lunatic asylum at Caen, where he died of a fit of apoplexy, on February 7, 1834. His Mémoires sur Napoléon, le Directoire, le Consulat, l'Empire et la Restauration, edited by Villemarest, appeared in the years 1829–31, in ten volumes. They contain many interesting particulars of the youth of Napoleon, and also of the history of the directory and consulate, although they are blamed for want of accuracy in many points of detail.

BOURSAULT, EDME, was born in 1638, at Mucit-l'Evêque, in the province of Burgundy, grew up without education, and went, in 1651, to Paris, without understanding any language but his own provincial *patois*. Here he learned to speak and write French, and improved so fast that the composition of a book for the instruction of the dauphin was committed to him. This work, La Véritable Étude des Souverains, pleased the king so much, that he appointed Boursault assistant instructor of his son. Boursault declined the office, and also refused to offer himself as a candidate for admission into the Academy, on account of his ignorance of Latin. In his youth he undertook a poetical gazette, with which the king and court were so much pleased, that an annuity of 2000 livres was granted him. But happening to satirize in this work a ludicrous adventure which had befallen a Capuchin, the confessor of the queen caused the journal to be suppressed, and Boursault himself escaped the Bastile only by the influence of the Prince of Condé. Another journal of his was suppressed soon after, on account of a satirical couplet on King William, with whom the French court then wished to negotiate. He was more fortunate in his writings for the stage, and many of his pieces met with permanent success; among others, Ésope à la Ville, and Ésope à la Cour, which still continue on the stage. His two tragedies Marie Stuart and Germanicus are forgotten. Boursault had the misfortune to quarrel with Molière and Boileau. He wrote a severe criticism on the École des Femmes, under the title of Le Portrait du Peintre. Molière chastised him in his Impromptu de Versailles. To revenge himself on Boileau, who had ridiculed him in his satires, he wrote a comedy called Satyre des Satyres; but Boileau prevented its performance. Boursault afterwards took a noble revenge. He heard that Boileau was at the baths of Bourbonne entirely destitute; he hastened to him and compelled him to accept a loan of 200 louis d'or. Touched by this generous conduct, Boileau struck his name from his satires. Boursault died at Montluçon, in 1701.

BOUSSA, a city, Africa, Soodan, capital of the province of same name, on an island in the Niger or Quorra, about 3 miles long and 1 mile broad; lat. 10° 14′ N.; lon. 6° 11′ E. It is walled, and being surrounded by rocks is a place of considerable strength. As in all African cities, the houses are irregularly placed, and thus cover a space of ground disproportioned to the number of inhabitants. The soil of the province is fertile, producing corn, yams, cotton, rice, and timber trees in great abundance. Amongst the wild animals are elephants, hippopotami, lions, tigers, &c. Boussa has obtained a melancholy notoriety from the circumstance of its being the place where the enterprising traveller Park met his death in 1805. The pop. of the town of Boussa has been estimated at 12,000 to 18,000.

BOUSTROPHEDON, a kind of writing which is found on Greek coins, and in inscriptions of the remotest antiquity. The lines do not run in a uniform direction from the left to the right, or from the right to the left; but the first begins at the left, and terminates at the right; the second runs in an opposite direction, from the right to the left; the third, again, from the left, and so on alternately. It is called *boustrophedon* (that is, *turning back like oxen*) because the lines written in this way succeed each other like furrows in a ploughed field. The laws of Solon were cut in tables in this manner.

BOUTERWEK, FRIEDRICH, professor of moral philosophy at Göttingen, a man of much merit as an academical instructor and a writer on literature, was born April 15, 1766, at Oker, a village not far from Goslar, in North Germany. After applying himself to many departments of learning, jurisprudence, poetry, &c., he at last became entirely devoted to philosophy and literary history. He was at first a follower of Kant, but finally attached himself to Jacobi. His Ideen zu einer allgemeinen Apodiktik was the immediate fruit of his intimate acquaintance with the philosophical views of Fr. H. Jacobi. This work was published in two volumes, 1799. It was afterwards completed by the Manual of Philosophical Knowledge (two vols., 1813; 2d edition, 1820), and by the Religion of Reason (Göttingen, 1824). In this work, as well as in his Aesthetik (two vols. 1806 and 1824), he had to contend with many powerful antagonists. Bouterwek has gained a permanent reputation by his Geschichte der neuern Poesie und Beredsamkeit (History of Modern Poetry and Eloquence), published 1801–19, a work which, though unequal in some respects, and in parts, especially in the first volume, partial and superficial, is an excellent collection of notices and original obeervations, and may be considered one of the best works of the kind in German literature. Among his minor productions, a selection of which he published in 1818, are many essays, which are superior to the best of his larger speculative works; for instance, the introduction to the History, in which he gives an account of his literary labours until that period, with great candour, and with almost excessive severity against himself.

Bouterwek died in 1828. His History of Spanish Literature has been translated into Spanish, French, and English.

BOUTS RIMÉS (French), words or syllables which rhyme, arranged in a particular order, and given to a poet with a subject, on which he must write verses ending in the same rhymes, disposed in the same order. Ménage gives the following account of the origin of this ridiculous conceit, which may be classed with the eggs and axes, the echoes, acrostics, and other equally ingenious devices of learned triflers. 'Dulot (a poet of the seventeenth century) was one day complaining, in a large company, that 300 sonnets had been stolen from him. One of the company expressing his astonishment at the number, "Oh," said he, "they are blank sonnets, or rhymes (*bouts rimés*) of all the sonnets I may have occasion to write." This ludicrous statement produced such an effect that it became a fashionable amusement to compose blank sonnets, and in 1648 a 4to volume of bouts rimés was published.' Sarrazin's Dulot Vaincu, ou la Défaite des Bouts Rimés, is an amusing performance.

BOVINO (anciently *Bovinum*), a town, Italy, Naples, province of Foggia, 20 miles s.s.w. Foggia, near the Cervaro; the seat of a bishopric, suffragan to Benevento. It is fortified, and has a cathedral, two parish churches, and several convents. The Spaniards were defeated here by the Imperialists in 1734. Pop. 5721.

BOW, the name of one of the most ancient and universal weapons of offence. It is made of steel, wood, horn, or other elastic substance, which, after being bent by means of a string fastened to its two ends, in returning to its natural state, throws out an arrow with great force. The figure of the bow is nearly the same in all countries, having generally two inflexions, between which, in the place where the arrow is fixed, is a right line. The Grecian bow was somewhat in the form of the letter Σ: in drawing it, the hand was brought back to the right breast, and not to the ear. The Scythian bow was distinguished for its remarkable curvature, which was nearly semicircular; that of the modern Tartars is similar to it. The materials of bows have been different in different countries. The Persians and Indians made them of reeds. The Lycian bows were made of the cornel-tree; those of the Ethiopians, of the palm-tree. That of Pandarus (Il. iv. 104) was made from the horn of a mountain goat, 16 palms in length: the string was an oxhide thong. The horn of the antelope is still used for the same purpose in the East. The long-bow was the favourite national weapon in England. The battles of Crecy (1346), Poictiers (1356), and Agincourt (1415) were won by this weapon. It was made of yew, ash, &c., of the height of the archer. The arrow being usually half the length of the bow, the *cloth-yard* was only employed by a man 6 feet high. The arbalist, or cross-bow, was a popular weapon with the Italians, and was introduced into England in the thirteenth century. The arrows shot from it were called *quarrels*. The *bolt* was used with both kinds of bows.

Of the power of the bow, and the distance to which it will carry, some remarkable anecdotes are related. Xenophon mentions an Arcadian whose head was shot through by a Carduchian archer. Stuart (Ath. Ant. i.) mentions a random shot of a Turk, which he found to be 584 yards; and Mr. Strutt saw the Turkish ambassador shoot 480 yards in the archery ground near Bedford Square. Lord Bacon speaks of a Turkish bow which has been known to pierce a steel target or a piece of brass 2 inches thick. In the journal of King Edward VI. it is mentioned that 100 archers of the king's guard shot at a 1-inch board, and that some of the arrows passed through this and into another board behind it, although the wood was extremely solid and firm. It has been the custom of many savage nations to poison their arrows. This practice is mentioned by Homer and the ancient historians; and we have many similar accounts of modern travellers and navigators from almost every part of the world. Some of these stories are of doubtful authority, but others are well authenticated. Some poison obtained by Condamine from South American savages produced instantaneous death in animals inoculated with it. The poisoned arrows used in Guiana are not shot from a bow, but blown through a tube. They are made of the hard substance of the cokarito tree, and are about 1 foot long, and of the size of a knitting-needle. One end is sharply pointed, and dipped in the poison of woorali; the other is adjusted to the cavity of the reed from which it is to be blown by a roll of cotton. The reed is several feet in length. A single breath carries the arrow 30 or 40 yards. See Bancroft's History of Guiana.

BOW, in music, is the name of that well-known implement by the means of which the tone is produced from viols, violins, and other instruments of that kind. It is made of a thin staff of elastic wood, tapering slightly till it reaches the lower end, to which the hairs (about 80 or 100 horse-hairs) are fastened, and with which the bow is strung. At the upper end is an ornamented piece of wood or ivory called the *nut*, and fastened with a screw, which serves to regulate the tension of the hairs. It is evident that the size and construction of the bow must correspond with the size of the species of viol-instruments from which the tone is to be produced.

BOWDICH, Thomas Edward, an ingenious and enterprising man; one of the victims of the attempts to explore the interior of the African continent. He was born at Bristol in June, 1790, and was sent to Oxford, but was never regularly matriculated. At an early age he married, and engaged in trade at Bristol. Finding the details of business irksome, he obtained the appointment of writer in the service of the African Company, and set sail for Africa in 1814. In 1816, it being thought desirable to send an embassy to the Negro King of Ashantee, Bowdich was chosen to conduct it; and he executed with success the duties of his situation. After remaining some time in Africa he returned home, and soon after published his Mission to Ashantee, with a Statistical Account of that Kingdom, and Geographical Notices of other Parts of the Interior of Africa (1819, 4to). Having offended the company in whose service he had been engaged, and having, therefore, no prospect of farther employment, yet wishing ardently to return to Africa for the purpose of visiting its hitherto unexplored regions, Bowdich resolved to make the attempt with such assistance as he could obtain from private individuals. He, however, previously went to Paris to improve his acquaintance with physical and mathematical science. His reception from the French literati was extremely flattering. A public eulogium was pronounced on him at a meeting of the Institute, and an advantageous appointment was offered him by the French government. To obtain funds for the prosecution of his favourite project, Bowdich also published a translation of Mollien's Travels to the Sources of the Senegal and Gambia, and other works; by the sale of which he was enabled, with a little assistance from other persons, to make preparations for his second African expedition. He sailed from Havre in August, 1822, and arrived in safety in the river Gambia. A disease, occasioned by fatigue and anxiety of mind, here put an end to his life, January 10, 1824.

BOWDOIN, James, a governor of Massachusetts, was born in the year 1727, at Boston, New England.

In 1753 he was elected a representative to the general court, and in 1756 became a member of the council. In this situation he continued until 1769, when he was negatived by Governor Bernard on account of his decided Whig principles, but afterwards accepted by Hutchinson because he thought his influence more prejudicial 'in the house of representatives than at the council board.' In consequence of his being a member of the committee who prepared the answer to the governor's speeches, which asserted the right of Great Britain to tax the colonies, he was negatived by Governor Gage in the year 1774. In 1785 he was appointed governor of Massachusetts, and had the good fortune to crush, without a single execution, an insurrectionary movement against the government. Governor Bowdoin was a member of the convention of Massachusetts assembled to deliberate on the adoption of the constitution of the United States, and exerted himself in its favour. He was ever an ardent lover of learning and science, and a benefactor to others of the same character. The University of Edinburgh honoured him with the degree of LL.D., and the Royal Societies of Dublin and London, with several other foreign societies, admitted him among their members. His letters to Dr. Franklin have been published. He died at Boston, 1790.

BOWER. See ANCHOR.

BOWER, ARCHIBALD, a Scottish writer, born near Dundee in 1686, of Catholic parents, and entered the order of Jesuits in 1706. He settled at Macerata, where, according to his own account, he was a counsellor of the Inquisition. In 1726 he quitted the order of Jesuits and went to Perugia, whence he fled secretly to England, and professed himself a convert to the Protestant faith. He obtained respectable patronage, was engaged as a tutor in a nobleman's family, and employed by the booksellers in conducting the Historia Literaria, a monthly review of books, and in writing a part of the Universal History, in sixty vols. 8vo. The money which he gained by these occupations he is believed to have given or lent to the society of the Jesuits, and thus to have purchased his re-admission among them about the year 1744. Subsequently repenting of the engagement he had made with his old associates, he claimed and recovered the property he had advanced. In 1748 he published the first volume of a History of the Popes, which was continued to seven volumes, and characterized by the utmost zeal against Popery. His money transactions with the Jesuits being at last brought to light, he was generally believed to be a man destitute of moral or religious principle; so that towards the end of his life he had hardly a friend or patron left except Lord Lyttleton. He died a Protestant in 1766.

BOWER-BIRD, a name given to certain Australian birds belonging to the family of the Sturnidæ, which have received their common name from a remarkable habit they have of building bowers, in which they congregate at certain seasons. They have lately attracted a good deal of attention through the account of them given by Mr. Gould, and through the fact that a pair of one species of these birds have been brought alive to London, where they now form one of the attractions of the Zoological Gardens. This species is the *Satin Bower-bird* (*Ptilonorhynchus holosericeus*), so-called on account of its beautiful glossy plumage. The male is really a splendid bird. The feathers of the body are of a deep bluish-black colour; the wing-feathers are quite black, except at the tips, where they are blue; the iris is bright blue, with the exception of a narrow red ring next to the pupil; the bill is light-blue; yellow at the tip; and the foot is reddish. The bird is a native of New South Wales, and its favourite resort is the luxuriant and densely-wooded regions of that part of Australia. The bowers above-mentioned are commonly constructed under the protection of overhanging branches of trees in the most retired parts of the forest, and always on the ground. At each end there is an entrance left open. They are commonly adorned with all sorts of bright-coloured objects, such as the variegated tail-feathers of different kinds of parrots, mussel-shells, small pebbles, bones, &c. The feathers are stuck in between the twigs with which the bowers are built, and the other ornaments are laid out at the entrance. These bowers do not serve as nests at all. They rather seem to be places of amusement for both the male and female birds, which are seen sportively running out and in the bowers in pursuit of one another. Apparently they are used as a sort of rendezvous during the pairing and breeding season.—Another species, the *Chlamydera maculata*, is nearly allied to the satin bower-bird. It is about 11 inches in length; the general colour of the plumage is brown, but the underside is grayish-white. Its neck is adorned by a collar of elongated feathers of a light rose-pink, which form a sort of fan. This species is confined to the interior of Australia. It is very shy, and is therefore seldom seen by travellers. Its bowers are constructed with even more art than those of the satin bower-bird, and are more profusely adorned.

BOWIE-KNIFE, a long kind of knife like a dagger, but with only one edge, named after Colonel James Bowie. It was originally a weapon confined to Texas, but is now used in almost all the states of the Union. Bowie is said to have had his sword broken down to within about 20 inches of the hilt in a fight with some Mexicans, but he found that he did such good execution with his broken blade, that he equipped all his followers with a similar weapon.

BOW INSTRUMENTS are all the instruments strung with cat-gut or goat-gut, from which the tones are produced by means of the bow. The most usual are the double bass (*violono* or *contrabasso*); the small bass, or *violoncello;* the tenor (*viola di braccio*); and the violin proper (*violino*). In reference to their construction, the several parts are alike: the difference is in the size. See VIOLIN and QUARTETT.

BOWLES, WILLIAM LISLE, an English poet of some note, was born on 24th September, 1762, at King's Sutton, on the borders of Northamptonshire, where his father was vicar. When he was seven years old the family removed to Uphill, Somersetshire, owing to his father having been presented to the living of that parish. At the age of fourteen he was sent to Winchester School, under the mastership of Dr. Joseph Warton. In 1782 he proceeded to Trinity College, Oxford, where he gained high honours, and remained till 1787. A disappointment in love led, about this time, to his undertaking a journey through Great Britain and to the Continent, and on this tour he composed, for his amusement, a series of sonnets, which he afterwards published in 1789, under the title of Fourteen Sonnets written chiefly on Picturesque Spots during a Journey. The success of these was extraordinary, and they may be said to have inaugurated a new school of poetry, the excellences of which were afterwards fully developed by Wordsworth and Coleridge. The freshness and originality of the sonnets attracted Coleridge—then a pupil at Christ's Hospital—so powerfully that, as he informs us, he wrote out in his own hand, within eighteen months, no fewer than forty copies as presents for his friends. In 1792 Bowles entered holy orders; and after two successive appointments in the county of Wilts, was presented to a living in Gloucestershire. In 1797 he married a daughter of Dr. Wake, prebendary of Westminster, was made a

prebend of the cathedral of Salisbury in 1803, and in 1805 was presented by Archbishop Moore to the living of Bremhill, in Wiltshire, where he continued to reside almost continuously during the remainder of his life. The previous year (1804) he had published the Spirit of Discovery, a poem in blank verse, in six books; and in 1807 appeared his edition of Pope's works, in ten volumes. To this last he appended an essay on The Poetical Character of Pope, which, from the comparatively depreciative estimate which he expressed as to the quality of his poetry, and also from the attacks on Pope's moral character, drew down on him the satirical lash of Lord Byron in his English Bards and Scotch Reviewers, and at a later period called forth from Campbell in 1819, in his Specimens of the English Poets, an elaborate attack on the critical soundness of the principles advanced in the essay.

In 1815 Bowles published his Missionary, a poem in six books, which is perhaps the best of his works. His subsequent poetical writings were The Grave of the Last Saxon, a legend of the battle of Hastings, in six books, published in 1822; Days Departed, or Banwell Hill, a descriptive poem in blank verse, published in 1829; St. John in Patmos, a poem in blank verse, published anonymously in 1833; Scenes and Shadows of Days Departed, a series of poems; and the Village Verse-book, a collection of hymns, both published in 1837. He died at Salisbury on 7th April, 1850, in his eighty-eighth year.

BOWLINE, a rope leading forward, which is fastened by bridles to loops in the ropes on the perpendicular edge of the square sails. It is used to keep the weather-edge of the sail tight forward and steady when the ship is close hauled to the wind. Hence a ship is said to sail on a bowline, or to stand on a taut bowline.

BOWLS, Bowling, an ancient British game, still extremely popular. It is played on a smooth, level piece of green sward, generally about 40 yards long, and surrounded by a trench or ditch about 6 inches in depth. A small white ball, called the *jack*, is placed at one end of the green, and the object of the players, who range themselves in sides at the other, is so to roll their bowls that they may lie as near as possible to the jack. Each bowl is *biassed* by being made slightly conical, so as to take a curvilinear direction; and in making the proper allowance for this bias, and so regulating the cast of the ball, consist the skill and attraction of the game. The side which owns the greatest number of bowls next the jack, each bowl so placed constituting a point, carries off the victory. Another description of bowling forms a favourite game in America, and has recently been introduced into this country. It is played generally in-doors, in a covered alley of carpenter's work, from 50 to 65 feet in length, and about 4 feet in width. The alley has a gutter, so called, on each side, and is slightly convex in the centre, and regularly bevelled to the sides. At the further extremity ten pins, generally of ashwood, of about 1 foot in height, are set up in the form of a pyramid. The players roll wooden balls at these, and endeavour to knock down as many as possible at each throw. The pins, when set up, are termed a *frame*, and at each frame the bowler rolls three balls. The number of pins knocked down is registered, and the frame set up again for the next player.

BOWRING, Sir John, a distinguished English statesman and linguist, was born at Exeter, October 17, 1792. While still very young he was taken by his father into his own business, and employed by him to travel in different parts of Europe. Having an extraordinary linguistic faculty, he made use of his residence in foreign countries to acquire the different languages, and his first publications consist of translations, especially of the popular poetry of many of the countries he had visited. At the same time he appeared as a supporter of the Radical politics of the time, and of the views of Jeremy Bentham, and acted as editor of the Westminster Review from 1825 till 1830. His public life began in 1828, when he was sent to Holland to make a report on the public accounts of that kingdom. He afterwards received similar commissions to France, Switzerland, Italy, Egypt, Syria, and Germany, and the Blue-books which appeared from his pen on these separate occasions are considered as models of their kind. He was member of Parliament for the Kilmarnock Burghs from 1834 to 1837; and for Bolton from 1841 to 1849. In the year last mentioned he accepted the lucrative post of consul at Canton, and his services during the four years that he held this post were so appreciated by the ministry that in 1854, the year after his return, he received the honour of knighthood, and was appointed governor of Hong-kong. As governor of Hong-kong he acted with the same energy that he had manifested when consul at Canton; but the step which he took in ordering Canton to be bombarded to punish the Chinese for an insult offered to the British flag, although approved by Lord Palmerston, then at the head of the government, led to his recall, March, 1857. The last public commission he received was in 1861, when he was sent to Italy to report on our commercial relations with the new kingdom. He died at his residence, Claremont, near Exeter, Nov. 23, 1872.

BOWYER, William, an English printer and classical scholar of eminence in the last century. He was a native of London, where his father, also a printer, carried on business. The son acquired the rudiments of learning under Ambrose Bonwicke, a nonjuring clergyman, and was afterwards admitted a sizar of St. John's College, Cambridge, but left the university without a degree in 1722, and became an associate in trade with his father. In 1729 he obtained the office of printer of the votes of the House of Commons, which he held nearly fifty years. He was subsequently appointed printer to the Society for the Encouragement of Learning, the Society of Antiquarians, of which learned body he was admitted a member; and in 1760 Lord Macclesfield procured him the appointment of printer to the Royal Society. In 1767 he was nominated printer of the journals of the House of Lords, and the rolls of the House of Commons. He died in 1777, aged seventy-eight, and was interred in the church of Low Layton, in Essex. By his will he bequeathed a considerable sum of money, in trust to the Stationers' Company, for the relief of decayed printers or compositors. His principal literary production was an edition of the New Testament in Greek, with critical notes and emendations. He also published several philological tracts, and added notes and observations to some of the learned works which issued from his press. About ten years previous to his decease he entered into partnership with Mr. John Nichols, who shortly after that event published a small volume of biographical anecdotes of Bowyer and his learned contemporaries, which formed the basis of his Literary Anecdotes of the Eighteenth Century, nine volumes 8vo—a work containing a vast mass of indigested materials for a history of English literature during the period to which it relates.

BOXHORNIUS, Marc Zuerius, a celebrated Dutch critic, son of a clergyman who had abandoned the Roman Catholic for the Protestant religion, was born at Bergen-op-Zoom in 1612, studied at Leyden, and gave proofs of talent so precocious that at seventeen he wrote Latin poems which were much esteemed,

and before he attained his twentieth year was appointed professor of eloquence. Oxenstiern, ambassador of Christina, queen of Sweden, endeavoured by tempting offers to allure him to Sweden, but he preferred his own country, and succeeded the celebrated Daniel Heinsius in the chair of history and politics. His literary career was brilliant but short, as he was cut off at Leyden in 1653, in his forty-first year. Among his works are a Universal History, which has been continued by Mencke; Virorum Illustrium Monumenta et Elogia, with curious engravings; Chronologia Sacra; Theatrum, or New Description of Holland, with Views of the Cities; and a tract, De Typographicæ Artis Inventione, in which he gives the honour of the invention of the art of printing to Haarlem.

BOXING, a manner of fighting with the fists so common in England as to be regarded abroad as a national characteristic. The art of boxing consists in showing skill in dealing blows with the fist against one's opponent, especially on the lower part of the body, while at the same time one protects one's self. The art is carried on according to certain rules, which are universally observed—for example, that as long as one of the combatants is lying on the ground he may not be struck by the other. The one who first intimates his desire that the combat should cease, or who is unable to rise again within a given time after being knocked down, is considered to be beaten. In England professional boxers, who made a livelihood out of their skill in the art, were at one time common, especially during the reigns of the Georges. At the beginning of the present century persons of the highest rank were sometimes to be seen at pugilistic combats, and 'professors' of the art frequently had members of the nobility among their pupils. Byron relates in his diary that he received instruction in boxing from the celebrated Jackson, who made a fortune as a pugilist. Boxing has, however, now fallen in a great measure into disrepute, but matches, when they do occur, still excite a great deal of interest, and they are even defended by a portion of the English press as tending to keep up a manly spirit among the lower classes. Prize-fights are illegal in England, and both the principals and the spectators may be proceeded against. In ancient times boxing was practised in the Greek games and in the Roman gladiatorial spectacles. Among both Greeks and Romans the weapon of offence was not the naked fist, but it was armed with a kind of glove called cestus, made of leather thongs, and sometimes loaded with iron or lead. It is not to be wonderod at that these fights were often fatal. See Boxiana, or Sketches of Ancient and Modern Pugilism, by Pierce Egan (four vols. London, 1824).

BOXING DAY, the day after Christmas, which was made a bank-holiday by the act of 1871, and which has long been held almost universally as a holiday in the southern portion of our island. It is so called from the practice of giving Christmas boxes as presents on that day.

BOX-TREE. The box-tree (*Buxus sempervirens*) is a shrubby evergreen tree, 12 or 15 feet high, which has small, oval, and opposite leaves, and grows wild in several parts of Britain. It has been remarked that this tree was formerly so common in some parts of England as to have given name to several places, particularly to Box Hill in Surrey, and Boxley in Kent; and in 1815 there were cut down at Box Hill as many trees of this sort as produced upwards of £10,000. This tree was much admired by the ancient Romans, and has been much cultivated in later times on account of its being easily clipped into the form of animals and other fantastic shapes. The wood is of a yellowish colour, close-grained, very hard and heavy, and admits of a beautiful polish. On these accounts it is much used by turners, by engravers on wood, carvers, and mathematical instrument makers. Flutes and other wind instruments are formed of it; and furniture made of boxwood would be valuable were it not too heavy, as it would not only be very beautiful, but its bitter quality would secure it from the attacks of insects. In France it is much in demand for combs, knife-handles, and button-moulds. Large quantities of boxwood are exported from Spain and Portugal, and also from Turkey and Circassia. It is worth £6 or £7 a ton. An oil distilled from the shavings of boxwood has been found to relieve the toothache, and to be useful in other complaints; and the powdered leaves destroy worms.

BOYACA, formerly the largest department of the South American republic of New Grenada, now one of the United States of Colombia, which was formed in 1858 out of that department, along with the provinces Casanare, Tundama, and Tunja, and parts of Velez. Afterwards, however, a part was taken away to form the state of Tolima. The state is bounded on the E. and N.E. by the republic of Venezuela, on the S.E. and S.W. by the state of Cundinamarca, and on the N.W. by the state of Santander. In the W. it is traversed by a chain of the Andes, and in the E. it is composed of immense plains, watered by affluents of the Orinoco. The western elevated portion produces the European cereals in abundance, and is also rich in metals, especially copper ore, and in precious stones. The climate is very various. The capital is Tunja. The pop. in 1870 was 482,874.

BOYCE, WILLIAM, an eminent musical composer in the last century. He was a native of London, and was a pupil of Dr. Maurice Greene, organist of St. Paul's, who at his death bequeathed him a valuable collection of church music, which served as the basis of a splendid publication of that class by Boyce in three vols. folio. Notwithstanding he was afflicted with deafness, which increased to such a degree as to render him almost insensible of sound, he acquired an uncommon degree of skill in his profession. In 1736 he was chosen organist to the church of St. Michael, Cornhill; and was also appointed composer, and afterwards (in 1758) organist to the Chapels Royal. On his setting to music an ode performed at the installation of his patron the Duke of Newcastle as chancellor of Cambridge University in 1749, he was honoured with the degree of Doctor of Music; and in 1755 he became master of the king's band. He was the author of many admired pieces for the theatre, and for other places of public entertainment; but his fame chiefly depends on his sacred compositions. Dr. Burney observes that 'there is an original and sterling merit in his productions, founded as much upon the study of our own old masters as on the best models of other countries, that gives to all his works a peculiar stamp and character of his own for strength, clearness, and facility, without any mixture of styles or extraneous ornaments.' Dr. Boyce died of the gout in 1779, at the age of sixty-eight, and was interred in St. Paul's Cathedral.

BOYD, MARK ALEXANDER, a Scottish literary character of some little note, born in 1562. He was educated at Glasgow under the superintendence of his uncle, the archbishop of that see, and was equally conspicuous for the quickness of his parts and the turbulence of his disposition. Quitting study, he went to Paris, where he reduced himself to distress by gaming, and then resuming his studies with scholastic ardour, repaired to Bourges to attend the celebrated civilian Cujacius. To this professor he recommended himself by a compliance with his taste in Latin poetry, which gave a preference to Ennius

and the elder Latin poets. After leading a wandering life on the Continent for fourteen years, he returned to Scotland, and died at his father's seat in Ayrshire in 1601. He has received much the same eulogium in regard to graces of person, powers of mind, and various accomplishments, as the Admirable Crichton. He left various MSS. on subjects political, critical, and patriotic, but is popularly known only by his Epistolæ Heroidum, and his Hymni, published in the Deliciæ Poetarum Scotorum. They exhibit some tolerable imitations of Ovid, but otherwise display more learning than poetry.

BOYD, Robert, of Trochrig, an eminent divine of the seventeenth century, was born at Glasgow in 1578. He studied philosophy and divinity at the University of Edinburgh, and afterwards went to France, where he taught various departments of literature in the schools of Tours and Montauban. In 1604 he was ordained pastor of the church at Verteuil, and in 1606 he was appointed one of the professors in the University of Saumur. King James having heard of his worth and talents, offered him the principalship of the University of Glasgow, which he accepted. He afterwards became principal of the University of Edinburgh, and one of the ministers of that city. His last appointment was to Paisley. He died on the 5th of January, 1627, in the forty-ninth year of his age. Of his works, few of which are printed, the largest and best known is his Prælectiones in Epistolam ad Ephesios, printed in 1652, folio. An elaborate life of him is to be found among the Wodrow MSS.

BOYD, Zachary, a Scottish divine of the seventeenth century, was born before the year 1590, and was descended from the family of the Boyds of Pinkell in Carrick (Ayrshire). He was cousin to Robert Boyd of Trochrig. He received the rudiments of his education at the school of Kilmarnock, and passed through an academical course in the College of Glasgow. About the year 1607 he had finished his studies in his native country. He then went abroad, and studied at the College of Saumur in France under his relation, Robert Boyd. He was appointed a regent in this university in 1611, and is said to have been offered the principalship, which he declined. According to his own statement he spent sixteen years in France, during four of which he was a preacher of the gospel. In consequence of the persecution of the Protestants, he was obliged in 1621 to return to his native country. On his reaching Scotland he lived successively under the protection of Sir William Scott of Elie and of the Marquis of Hamilton and his lady at Kinneil, it being then the fashion for pious persons of quality in Scotland to retain one clergyman at least as a member of their household. In 1623 he was appointed minister of the large district in the suburbs of Glasgow styled the Barony parish, for which the crypts beneath the cathedral church then served as a place of worship. In this charge he continued all the remainder of his life. In the years 1634–35 and 1645 he filled the office of rector of the University of Glasgow, an office which appears from its constituency to have then been very honourable. In 1629 he published his principal prose work, The Last Battell of the Soule in Death: whereby are shown the diverse Skirmishes that are between the Soule of Man on his Deathbed and the Enemies of our Salvation, carefully digested for the Comfort of the Sicke. This was reprinted at Glasgow in 1831, with a life of the author, by Mr. Neil. Besides this, he published various other works, chiefly devotional, and left a large quantity of MS. writings, which are preserved in the Glasgow College library. Among the latter is one entitled Zion's Flowers, which consists of poems on select subjects of Scripture history. This work is popularly called Zachary Boyd's Bible, and many absurd stories are told of its contents. But although it abounds in homely and ludicrous passages, it is not without a fine strain of devotional feeling, and it owes much of its character to the spirit of the age in which it was written. Mr. Boyd died in 1653 or 1654, leaving a large legacy to the Glasgow College.

BOYDELL, John, an English engraver, but more distinguished as an encourager of the fine arts than on account of his own productions. He was born in Staffordshire in 1719, and was intended for his father's occupation, which was that of a land-surveyor. Accident having thrown in his way Baddeley's Views of different Country Seats, he conceived so strong an inclination for engraving that he determined to adopt it as a profession; and accordingly, when above twenty, he bound himself apprentice for seven years to Toms, a London engraver. In 1745 he published six small landscapes, and afterwards executed as many more views of places in and near London as formed a volume, which he published by subscription. With the profits of this work he commenced trade as a printseller, and by his liberality to artists in general established a high reputation as a patron of ingenious men. Woollet was employed by him to engrave the celebrated pictures of Niobe and Phaeton, and he furnished other eminent artists with occupation, and was thus enabled to carry on an extensive foreign trade in English prints, which tended greatly to his own emolument and to the credit and advantage of his native country. Having at length established what may be termed an English school of engraving, he next turned his attention to the improvement of the art of painting. With that view he engaged the first artists in the kingdom to furnish the collection of pictures forming the well-known Shakspeare Gallery. The wars arising out of the French revolution having obstructed his continental trade, he was induced in 1804 to solicit an act of Parliament to permit him to dispose of his gallery and paintings by lottery. This he obtained, and lived long enough to see every ticket disposed of, but died before the lottery was drawn, on the 12th of December, 1804.

BOYER, Alexis, a celebrated French surgeon, born of poor parents at Uzerches in Limousin in 1757; died at Paris in 1833. Although in his younger years he had to struggle against poverty and disease, he attended the lectures of Louis and Desault, and after a brilliant career as a student obtained the degree of Master of Surgery in 1787. The revolution was of great advantage to him. He became successively surgeon to the Hospital de la Charité and to the Hôtel-Dieu, and was appointed first surgeon to Napoleon, receiving at the same time the title of Baron of the Empire, with a dotation of 25,000 francs. He became a member of the Institute in 1825, and was consulting surgeon to Louis XVIII., Charles X., and Louis Philippe. His chief works are, Traité d'Anatomie (Paris, 1797–99); Traité des Maladies Chirurgicales et des Opérations qui leur conviennent (eleven vols., 1814–26). He also contributed to the Journal de Médecine and the Dictionnaire des Sciences Médicales.

BOYER, Jean Pierre, president of the Republic of Hayti, born Feb. 28, 1776, at Port-au-Prince; died at Paris July 9, 1850. He was a mulatto by birth, but came early to Europe, where he obtained a European education. In 1792 he entered the army, and fought with distinction against the English in San Domingo, but was nevertheless obliged to evacuate the island, to which he did not return till 1802. At first he acted as leader of the mulattoes in the war against the negroes, but afterwards effected a union

between these in order to prepare the way for the complete independence of the island. When Péthion established a free state in the western part of the island, Boyer undertook the command of the troops which were concentrated in Port-au-Prince. After the death of Péthion, Boyer himself was elected president (1818). By his skilful military operations, not less than by his adroit diplomacy, he finally succeeded in uniting the eastern part of the island with the republic, and thus effecting the complete separation of the island from France and Spain (1825). He also purified the internal administration, raised the financial condition of the republic, and bestowed particular care upon its educational institutions. The contest between mulattoes and negroes, however, still went on, and in the end the latter rose in rebellion against him, which compelled him to leave the island (1843). He never returned to the place of his birth and of his long-continued activity, but lived for the rest of his life first in Jamaica, and afterwards in Paris.

BOYLE, a garrison town, Ireland, county Roscommon, 22 miles S.E. from Sligo, on a stream of the same name, connecting Lough Gara with Lough Key in a valley nearly surrounded by hills. It consists of four principal streets, crossing at right angles, two of which are straight, the other two winding; one of the latter ascends a very steep hill, all indifferently paved and kept. The more modern houses, many of which are of stone, are well built, but in the outskirts are many miserable hovels. Boyle has an Episcopal church and chapel of ease, a Roman Catholic and two Methodist chapels, national and other schools, a workhouse, courthouse, and bridewell, the latter a plain building, with freestone front. A large number of cattle is sold at the fairs, which take place nine times a year. Pop. 3098.

BOYLE, CHARLES, the second son of Roger, earl of Orrery, was born in 1676 at Chelsea, and at fifteen entered a nobleman at Christ Church, Oxford, under the care of Dr. Atterbury. While there, he published a new edition of the epistles of Phalaris, of which Dr. Bentley questioning the authenticity, he wrote an answer entitled Dr. Bentley's Dissertation on the Epistles of Phalaris examined, which produced the famous controversy alluded to in the article BENTLEY (which see). On leaving the university in 1700 he was chosen member for Huntingdon; and on the death of his brother succeeded to the earldom, and was soon after elected a Knight of the Thistle, and received the command of a regiment. In 1709 he was promoted to the rank of a major-general, and sworn of the queen's privy-council; he was also envoy-extraordinary from the queen to the states of Flanders and Brabant, at the critical period of the Treaty of Utrecht; and on his return was raised to the dignity of a British peer, under the title of Lord Boyle. He retired from court soon after the accession of George I., and in 1722 was sent to the Tower on suspicion of being concerned in Layer's plot, but was discharged after six months' imprisonment. He constantly attended the House of Peers as before, but never spoke, though he was often employed in drawing up protests. Besides the edition of Phalaris, he published a comedy called As you Find It; a copy of verses to Dr. Garth upon his Dispensary; and a Prologue to Southerne's play of the Siege of Capua. He died in 1731. His name of Orrery was given to an astronomical instrument, invented by Mr. George Graham, whom he patronized.

BOYLE, JOHN, Earl of Cork and Orrery, only son of the subject of the preceding article, was born in 1707. He published, in 1739, an edition of the dramatic works of his great-grandfather Roger, earl of Orrery, and in 1742 his State Letters. His own earliest publication was a translation of two odes of Horace in 1742, which work was followed in 1751 by his Translation of the Epistles of Pliny the Younger, with Observations on each Letter, and an Essay on Pliny's Life. This translation advanced his reputation as a polite scholar, but has since been eclipsed by the superior version of Melmoth. In 1754 he made the tour of Italy, and employed himself in collecting materials for a history of Tuscany, which he intended to write in a series of letters, twelve only of which have been published since his death. They are written in an agreeable manner, and contain some curious information respecting the Medici family. He died in 1762.

BOYLE, RICHARD, Earl of Cork, a statesman of note in the seventeenth century, born in 1566. In 1588 he went to Dublin with strong recommendations to persons in power, whose patronage he obtained. The state of Ireland at that time having rendered land very cheap, he took advantage of the circumstance to make some considerable purchases, among which was the estate of Sir Walter Raleigh, consisting of 12,000 acres in the counties of Cork and Waterford, which he obtained on easy terms. He was then appointed clerk of the council under Sir George Carew, the president of Munster, whom he accompanied in various expeditions against the Irish insurgents, in opposition to the English government. On these and other occasions he distinguished himself by his talents and activity, and rapidly augmented his political power and influence. King James I. appointed him privy-councillor for Munster, and afterwards for the Kingdom of Ireland; in 1616 he was made a peer of that realm by the title of Baron Boyle of Youghall, and in 1620 he was created Viscount Dungarvan and Earl of Cork. He was now in the height of his prosperity, living in his castle of Lismore in a style of grandeur more resembling that of a sovereign prince than of a private individual. In 1629 he was made one of the lords justices of Ireland, and in 1631 lord-treasurer of that kingdom. Like most of the English rulers of the sister island, he seems to have employed his power rather for the subjugation than the advantage of the native Irish. He built and fortified towns and castles, and introduced among the people arts and manufactures; but he put in force the severe laws of Queen Elizabeth against the Catholics, and transported multitudes of the ancient inhabitants from the fertile province of Leinster to the bogs and deserts of Kerry, supplying their place with English colonists. In 1641 the earl went to England as a witness against Lord Strafford, then under impeachment, having quarelled with that nobleman during his vice-royalty. Soon after his return home the insurrection of the Irish broke out; on which event he displayed his accustomed activity, enlisting his tenantry under the command of his sons, and taking other measures for the defence of the country. But he lived only to see the commencement of the calamities of his adopted country, dying in 1643 or 1644. Lord Cork is principally memorable as the founder of a family, several individuals of which have highly distinguished themselves as cultivators of literature, science, and the arts; yet it should not be forgotten that he attained a high degree of contemporary fame, and was designated in the age in which he lived—'The great Earl of Cork.'

BOYLE, ROBERT, a celebrated natural philosopher, was born at Lismore, in Ireland, 1626, and was the seventh son of Richard the great earl of Cork. In 1638 he went to Geneva, under the care of a learned French gentleman, where he continued to pursue his studies for several years. In 1641 he made a journey to Italy. In 1642 he was left at Marseilles

destitute of money, on account of the breaking out of the Irish rebellion. This circumstance did not allow him to return to England until 1644. During this period his father had died, leaving him considerable property. He now went to his estate at Stalbridge, where he devoted himself to the study of physics and chemistry. He was one of the first members of a learned society founded in 1645, which at first went under the name of the Philosophical College. On account of the political disturbances this society retired to Oxford, but was revived after the restoration under the name of the Royal Society. Boyle occupied himself at Oxford in making improvements in the air-pump. Like Bacon, he esteemed observation the only road to truth. He attributed to matter merely mechanical properties. Every year of his life was marked by new experiments. We are indebted to him, indirectly, for the first certain knowledge of the absorption of air in calcination and combustion, and of the increase of weight which metals gain by oxidation. He studied the chemical phenomena of the atmosphere, and was thus a predecessor of Mayow, Hales, Cavendish, and Priestley. In all his philosophical inquiries he displayed an accurate and methodical mind, relying wholly upon experiments. At the same time, his imagination was warm and lively, and inclined to romantic notions, which were first produced, in his childhood, by the perusal of Amadis of Gaul, and always exercised a visible influence on his character. He was naturally inclined to melancholy, and this temper of mind was increased by circumstances. The sight of the great Carthusian monastery at Grenoble, the wildness of the country, as well as the severe ascetic life of the monks, made a deep impression upon him. The devil, as he said, taking advantage of his melancholy disposition, filled his soul with terror, and with doubts concerning the fundamental doctrines of religion. This condition was so insufferable, that he was tempted to free himself from it by committing suicide, and was only prevented by the fear of hell. While endeavouring to settle his faith, he found those defences of the Christian religion which had been published before his time, unsatisfactory. In order, therefore, to read the original works, which are considered the foundation of Christianity, he studied the oriental languages, and formed connections with Pococke, Thomas Hyde, Samuel Clarke, Thomas Barlow, &c. The result of his studies was a conviction of its truth, which was manifested not only by his theological writings, but by his benevolence and generous disinterestedness. He instituted public lectures for the defence of Christianity, devoting an annual sum to the payment of a lecturer. The first series of these lectures was delivered by the distinguished scholar, Richard Bentley, in 1692. Among the other celebrated men who have at different times been appointed Boyle lecturers may be mentioned Samuel Clarke, in 1705; Whiston, the translator of Josephus, in 1709; and F. D. Maurice, in 1846. These lectures are only printed occasionally, and at long intervals. A collection embracing those delivered between 1692 and 1732 was published in 1739 (London, three vols.) Boyle did much for the support of the mission in India, and caused Irish and Gaelic translations of the Bible to be made and printed at his own expense. To his religious principles were united the purest morals, a rare modesty, and an active benevolence. He died at London in 1691, and was interred in Westminster Abbey. Birch published an edition of his works, five vols. folio, London, 1744.

BOYLE, Roger, Earl of Orrery, fifth son of the first Earl of Cork. He was born in 1621, and when only seven years old was created Baron Broghill, by which title he is usually known. He was educated at Trinity College, Dublin; after which he travelled on the Continent, and returned home at the commencement of the Irish rebellion. He commanded a troop of cavalry raised by his father, was employed in the defence of the castle of Lismore, and displayed his courage and ability on many occasions in the service of Charles I.; on the cessation of whose authority he acted under the parliamentary commissioners in Ireland. When the king was put to death he retired for a while from public life; but being courted by Cromwell, he accepted a commission from him, and assisted him materially in reducing the Irish to subjection. He served his new master with zeal and fidelity, and few persons were more trusted or distinguished by him. Oliver becoming Protector, made Lord Broghill one of his privy-council and a member of his House of Lords. In 1656 he sent him to Scotland, with a commission to govern there with absolute authority for one year; and his conduct was such as proved satisfactory both to the Scots and the Protector. On the death of Cromwell, becoming aware of the approaching restoration of regal power, he exerted himself with such dexterity and success in promoting it as to obtain much credit for his conduct. Charles II. rewarded him with the title of Earl of Orrery, and he was appointed one of the lords justices for Ireland. He died October 16, 1679.

BOYNE, a river of Ireland, running into the Irish Channel, near which was fought a celebrated battle between the adherents of James II. and William III., in 1690; the latter proved victorious, and James was obliged to flee to the Continent. The river rises in the Bog of Allen, and after a winding course of about 60 miles, falls into the sea 4 miles E. by N. of Drogheda.

BOZZARIS, Marcos, a hero of the Greek war of Independence against the Turks, was descended from a Suliote family renowned for its bravery, and was born about the end of last century. After the fall of Suli he retired to the Ionian Islands, from whence he made a vain attempt to deliver his native country. He then entered an Albanian regiment in the French service, and in 1813 became a member of the Hetæria, a society formed for national regeneration. In 1820, when the Turks were carrying on war against Ali Pasha, the latter sought aid from the exiled Suliotes, and Marcos Bozzaris returned to Epirus. On the outbreak of the war of Independence he at once joined the Greek cause, and distinguished himself as much by his patriotism and disinterestedness as by his military skill and personal bravery. In 1822 he took part in the war which was going on in Western Greece, and acquired special renown by his defence of Missolonghi. In the summer of 1823, when he held the command-in-chief of the Greek forces in that port, he was dangerously wounded at a night attack on the camp of the Pasha of Scutari, near Karpenisi, and died soon after at Missolonghi. His deeds are still celebrated by the Greeks in many popular songs. His brother Kosta (Constantine) was also one of the noblest characters connected with the same war. He died at Athens Nov. 13, 1853, as general and senator. See Greece.

BOZZOLO, a fortified town in Italy, Lombardy, province of Cremona, and 16 miles W.S.W. Mantua, near the right bank of the Oglio, with old fortifications, some silk looms, and an annual fair. Pop. 4049.

BRA, a town in Italy, Piedmont, province of Cuneo, 9 miles W.S.W. Alba. It has three parish churches, the principal of which is the Church of Santa Chiara, built in 1742 by Vettone. The town has a good trade in cattle, grain, wine, and silk, which last is held in high repute. Pop. 9125.

BRABANÇONNE, the national song of the Belgians during the revolution of 1830, composed by Jeuneval, at that time an actor at the theatre of Brussels, and set to music by Campenhout. Every verse of the song ends with the refrain:

'La mitraille a brisé l'orange
Sur l'arbre de la liberté.'

BRABANT is the central district of the lowlands of Holland and Belgium, extending over an area of 4337 square miles, from the left banks of the Waal to the sources of the Dyle, and from the Meuse and the plains of Limburg to the lower Scheldt. In the middle ages it formed a separate independent duchy, called Lower Lorraine. It is divided at present between the kingdoms of Holland and Belgium, into three provinces:—1st, Dutch or North Brabant, with an area of 1977 square miles, and a pop. of 429,000; 2d, the Belgian province of Antwerp, with an area of 1095 square miles, and a pop. of 492,482; and 3d, the Belgian province of South Brabant, with an area of 1276 square miles, and a uniformly dense pop. of 879,814. The country is comprehended in a plain, gently sloping to the N.W., which is occupied in the N. by heathy and marshy tracts, and in the S. passes into the gentle rising ground which forms the first ascent of the forest of Ardennes. It is copiously watered by the Meuse in the N. and the Scheldt in the S., in the former of which the internal transit is furthered by means of canals, among others the South William and the Breda Canals, and in the latter by railways, which have their point of union at Mechlin. Under the influence of a northerly, indeed, and moist, but in general healthy and mild climate, the great fertility of the soil renders agriculture and the rearing of cattle the principal and most profitable employment of the inhabitants. With this is associated the general diffusion of an active industry, which supports an extensive trade, consisting chiefly of lace, cotton, woollen, and leather goods.

Through Cæsar's campaigns the Romans became acquainted with the inhabitants of Brabant as a mixed race of Germans and Celts. The Menapians, particularly, inhabiting the country between the Rhine, the Meuse, and the Scheldt, made, as the most powerful and warlike among the various tribes, a gallant, though ultimately ineffectual resistance to the Roman arms, by whose conquests this portion of Lower Germany was incorporated with the province of Gallia Belgica. In the fifth century the Franks gained possession of Brabant, which in the sixth was, at the partition of the Frank kingdom, assigned to the primitive country of Austrasia; in the ninth century it was united to Lorraine; and on the division of the latter, in 870, became the property of France, from which, however, in the commencement of the tenth century, it was transferred by Henry I. again to Lorraine; in 959 to Lower Lorraine, and thus to Germany. In the beginning of the eleventh century it was separated from Lorraine, on Duke Otho, the son of Charles the Fat, who had been invested by the Emperor Otho with Lower Lorraine, dying childless in 1005. After this several Counts of Ardennes and Godfrey of Bouillon possessed it till 1076; the Emperor Henry V. mortgaged it to Godfrey the Bearded, of the family of the Counts of Louvain and Brussels, whose house reigned over Brabant to the middle of the fourteenth century. As early as 1190 we find the title of Duke of Brabant, in which the former title of Duke of Lower Lorraine or Lothier was gradually absorbed. Under the government of its own dukes Brabant gained rapidly in power and independence, but was engaged in numerous contests with its neighbours, and shifted much in its leanings between Germany and France. Of the six dukes of Brabant, Henry I. II. and III. and John I. II. and III. are more especially to be mentioned, John I., who, by the celebrated battle of Wöringen (1288), united Limburg to Brabant, and is also renowned in Germany as a minnesinger or troubadour, and John III., who, in 1349, received from the Emperor Charles IV. the important privilege of a free judicature, under the name of the Brabantine Golden Bull, in consequence of which his subjects ceased to be amenable to any foreign jurisdiction. With John III. the heirs male of the family of the Counts of Louvain became extinct in 1355, and, by the bequest of his daughter Joanna, who reigned till 1406, and married Wenceslaus of Luxemburg, Brabant came into the possession of the house of Burgundy, and in the first instance to Antony of Burgundy, Joanna's grand-nephew, and second son of Philip the Bold. On Antony's death at the battle of Agincourt, in 1415, and his two successors, his son John IV. and his brother Philip, count of St. Pol, dying childless respectively in 1427 and 1430, Brabant, as the inheritance of Philip the Good, became formally incorporated with the dominions of the house of Burgundy. In this state, however, it did not long continue, and, by the marriage of Mary of Burgundy with the Emperor Maximilian, was transferred to the house of Austria, and subsequently to the Emperor Charles V., from whom it afterwards passed to his son, Philip II. of Spain. The persecuting edict of the latter, and the Duke of Alva's cruelties, excited a revolt in Brabant, but it was only the northern portion (Hertogenbosch) which succeeded in asserting its independence, and in 1648 was incorporated with the United Provinces under the name of the Generality Territory, whilst South Brabant remained till 1714 in the possession of the Spaniards. On the extinction of the Spanish-Austrian line in the latter year, Brabant, with the other southern provinces of the Netherlands, reverted to the imperial house of Austria, which, however, was unable long to retain it in peace. On a violent contest breaking out under the Emperor Joseph II., as to the explanation of the provincial privileges which Brabant possessed under the Joyeuse Entrée (which see), and the consequent dismissal of the Assembly of the states of Brabant and Limburg, the Brabantines assembled of their own authority, and boldly pronounced the separation of Brabant from the supremacy of the house of Austria. Leopold II. settled the dispute after Joseph's death by granting their ancient privileges to the people of Brabant. The remainder of the history of Brabant will be found under BELGIUM.

BRACCIO DA MONTONE, ANDREA, a celebrated Italian captain, born at Perugia, of the illustrious family of the Fortebracci, in 1368, embraced the profession of arms, and began, at the age of eighteen, to serve with fifteen knights under the orders of the Count of Montefeltro. He afterwards entered the service of Ladislas, king of Naples, under the promise that he, if successful, would make him master of Perugia; but when the Perugians, determined, if possible, to keep out Braccio, offered to open their gates to Ladislas if he would retain it for himself, he made no scruple of accepting the offer and breaking faith with Braccio, who had the mortification of seeing that all the efforts which he had made in the hope of obtaining Perugia had only had the effect of more effectually excluding him from it. Braccio next entered the service of Florence, and revenged himself on Ladislas by stopping his progress while in the full career of victory. He afterwards attached himself to Pope John XXIII., who, on repairing to the Council of Constance, where he was deposed, intrusted Braccio with the defence

of Bologna. Ladislas being now dead, and the church without a head, Braccio, at the head of a bold and numerous body of troops bound to no other master, saw that the moment for which he had long watched and toiled had arrived; and allowing the Bolognese to redeem their liberty by the payment of a sum of money, suddenly, in 1416, pounced on the territory of Perugia. The Perugians vainly endeavoured to resist, and saw themselves compelled to receive Braccio as their lord. His rule, though firm and occasionally severe, was much milder than might have been anticipated; and by the numerous improvements which he introduced, he soon showed that his wisdom as a statesman was not less than his ability as a captain. Braccio having now gained the great object of his life, might have ended his days in tranquillity; but listening only to the promptings of ambition, he attempted the conquest of Rome, and gained several advantages over Sforza, who had long been his rival, and was then, from his talents and experience, the only leader fit to cope with him. Ultimately, however, the new pope, Martin V., proved more than a match for him, and Braccio, having not only been defeated but severely wounded, took the disgrace so seriously to heart that he would neither take food nor allow his wounds to be examined, and died in 1424.

BRACELET, a kind of ornament usually worn on the wrist, the use of which extends from the most ancient times down to the present, and belongs to all countries, civilized as well as uncivilized. The word is derived from the Low Latin *brachiale*, which is itself derived from *brachium*, the Latin word for the arm. Bracelets were in use in Egypt at a very remote period. They were of different colours, which were painted on them in enamel in very bright as well as very delicate shades. They were also then as now frequently made of gold, enchased with various kinds of precious stones. Several of these bracelets have come down to us from a period earlier by several centuries than the most ancient Greek monuments. They were not always worn, as with us, on the wrist, but frequently on the upper part of the arm. The ancient Medes and Persians were well known to be extremely fond of this method of adorning themselves; and in the Bible the bracelet is frequently mentioned as an ornament in use among the Jews, both men and women. Among the ancient Greeks, in historical times, bracelets do not appear to have been worn by the men; but, on the other hand, they were worn by the Greek ladies, made of every variety of material, and in every possible form. A preference was generally given to the spiral form, and a bracelet of this kind is described by Homer in the Iliad. Very frequently the spiral bracelets were made to assume the appearance of snakes, which went round the arm twice or thrice, or even a greater number of times. Among the ancient Italian tribes bracelets were also an ornament of the men. The Sabines often wore very heavy ones on the left arm. Among the Romans it was a frequent practice for a general to bestow bracelets on soldiers who had distinguished themselves by their valour. Roman ladies of high rank frequently wore them both on the wrist and on the upper arm. The Arabs and the orientals generally use them, chiefly as an ornament for women. Among the ancient heathen Germanic tribes they formed the chief and almost only ornament, as is shown by their being so often found in old graves. The men seem to have used them even more than the women, for bracelets have been found in dozens on the arms of the former. Presents of bracelets were indeed the best means that an ancient German chief could adopt in order to attach his followers to himself. Poets and minstrels were also often rewarded in the same way. The spiral was the favourite form with the ancient Germans as with the ancient Greeks. During the sixteenth century very massive bracelets were sometimes worn, which were at the same time very richly ornamented, and often several inches in breadth.

BRACHIOPODA, the name given to a class of Mollusca, subdivided into numerous families. Their shell is bivalve, and in this respect they resemble the Lamellibranchiata; but they are chiefly characterized by having an always open mantle, with two lobes, around the internal face of each of which the gills are arranged in small laminæ, and in having, instead of feet, two very singular, elongated, ciliated, and fleshy arms, provided with numerous filaments, which when used are stretched out beyond the shell, but when at rest are rolled up spirally within it. They have no proper power of locomotion, and remain fixed to submarine bodies. They are widely diffused, and in the fossil state are interesting to the geologist by enabling him to identify certain strata.

BRACHYPODIUM, a genus of grasses belonging to the division with many-flowered spikelets, and the glumes shorter than the lowest floret. The most common species is *B. sylvaticum* (wood fescue-grass), called also *Bromus sylvaticus* and *Festuca sylvatica*. It is a hairy, upright, perennial grass, with fibrous roots; grows about 2 feet high, is not uncommon in woods, where it may be sown as cover for game, but has little economical value. Its herbage is very coarse, and is generally refused by stock.

BRACT, a leaf, from the axil of which a flower or flower-stalk proceeds, and thus distinguished from the ordinary leaf, from the axil of which the leaf-bud proceeds. Bracts may thus be entirely similar to the ordinary leaves of a plant, and in that case they are called leafy bracts; but very commonly they are somewhat changed in form, and although they may be sometimes divided, they are for the most part entire, even when the ordinary leaves are divided. In some cases they are so much changed in form as to be mere scales or threads, and sometimes they are not developed at all, in which case the inflorescence is said to be ebracteated. Owing to the different ways in which the bract appears, it may in some plants be confounded with the calyx, in others with the corolla. When the flowers of a plant are sessile, the bracts are often applied closely to the calyx, and are thus apt to be confounded with it; and when the bracts are coloured, they are apt to be mistaken for parts of the corolla. When the inflorescence of a plant is branching, subordinate flower-stalks proceeding from one main flower-stalk, bracts are often seen at the base of the former, and these are called bracteoles.

BRACTEATES, thin coins of gold or silver, with irregular figures on them, stamped upon one surface only, so that the impression appears raised on one side while the other appears hollow. They were largely circulated under Otho I., emperor of Germany, and derive their name from *bractea*, signifying leaf of gold or other metal. They are of importance as illustrating history.—*Bracteated coins*, or *bracteati nummi*, a term used to signify coins or medals covered over with a thin plate of some richer metal. They are usually made of iron, copper, or brass, plated over and edged with gold or silver leaf. Some of them are to be found even among the truly ancient coins. The French call them *fourrées*.

BRACTON, Henry de, one of the earliest writers on English law, flourished in the thirteenth century. He studied civil and canon law at Oxford, and, about the year 1244, Henry III. made him one of his judges itinerant. Some writers say that he was afterwards chief-justice of England; but his fame at present is derived from his legal treatise entitled, De Legibus

et Consuetudinibus Angliæ, which was first printed in 1569 (folio), but of which a more correct edition was published in 1640 (4to).

BRADDOCK, EDWARD, major-general and commander of the British army in the expedition against the French on the river Ohio, in 1755, arrived in Virginia in February of that year, and in the spring marched against Fort du Quesne, now Pittsburg. He reached the Monongahela July 8, and next day moved forward to invest the fort. Disregarding, however, the caution of his provincial officers, who warned him of the danger of surprise in an Indian war, he fell into an ambuscade, by which he lost nearly one-half of his troops and received himself a mortal wound. The army was obliged to make a precipitate retreat of 40 miles to the camp of Colonel Dunbar, where Braddock expired.

BRADFORD, a town in the West Riding of Yorkshire, 29 miles N.E. of Manchester, with a pop. in 1871 of 145,827. It is pleasantly situated at the junction of three extensive valleys, and consists of an ancient and a more modern portion, the latter with spacious, well-built streets. The houses are mostly of freestone. The extent and importance of the town have greatly increased of late years in consequence of the extraordinarily rapid development of the worsted yarn and stuff trade, of which it is the centre. The town was incorporated in 1847, and its affairs are now managed by a mayor, 14 aldermen, and 42 councillors. The borough returns two members to Parliament. The appearance of the town has been almost completely changed since 1861. Formerly the streets in the older part were narrow, tortuous, and extremely inconvenient. Under the powers conferred by two special acts of Parliament, and at an expenditure of nearly £150,000, the corporation have effected most extensive street improvements, widening the principal thoroughfares, improving the gradients, and opening up new streets, which were greatly needed. A fine and spacious covered market has been erected at a cost of about £20,000. Among the public buildings are the court-house, erected in 1834; St. George's Hall, a splendid building in the Grecian style, erected in 1851, and capable of accommodating about 5000 persons; the new exchange, a temperance hall, and a mechanics' institute. There are seventy churches and chapels of all denominations. There are also a large number of schools, the principal of which are the free grammar-school, endowed by Charles II., and the high-school. Within the boundaries of the borough is Airedale College, for training young men for the ministry among the Independents. The Baptists have a similar institution at Rawdon, a few miles distant. Among the charitable institutions may be noticed the infirmary, with which is connected a dispensary; the eye and ear hospital, an institution for the blind, and the almshouses of the Tradesmen's Home Benevolent Society. On the outskirts of the town is Peel Park, of about 60 acres in extent, and very tastefully laid out. As already mentioned, the worsted yarn and stuff trade is the principal industry of the town, but there are also manufactures of alpaca stuffs, silk and velvet, mixed cotton and silk goods; and there are a few cotton factories. The Midland, Lancashire and Yorkshire, and Great Northern Railways afford the utmost facilities for communication with all parts of the kingdom.

BRADFORD, GREAT, an ancient market town, England, in the county of Wilts. The town is beautifully situated 28 miles N.W. of Salisbury, on a declivity, banks of the Lower Avon, here crossed by two bridges—a very old one of nine arches in the centre of the town, and a modern one of four. The town consists of three regular streets, containing many handsome and some elegant houses. Woollen cloth is the staple manufacture of the place, particularly that composed of fine Spanish and Saxony wool, for the dyeing of which the water of the river is highly favourable. Bradford was of some note in Anglo-Saxon times, St. Dunstan having been elected Bishop of Worcester at a synod held in it. Pop. 4871.

BRADFORD, JOHN, born at Manchester in the beginning of the reign of Henry VIII., obtained a situation in the commissariat, and having been guilty of some defalcation, known only to himself, was so impressed by a sermon of Latimer on restitution, that he determined not only to sell everything he had in order to make up the defalcation, but to renounce an employment which exposed him to dangerous temptations. He afterwards studied theology under Latimer, and entered the University of Oxford, where he took the degree of M.A. His modesty, notwithstanding the urgency of his friends, and among others the celebrated Martin Bucer, would not allow him for a long time to undertake the duties of a clergyman; but at last, in 1550, his scruples were overcome, and on taking orders he was appointed chaplain to the Bishop of London, and canon of St. Paul's. From this time he devoted himself to the duties of his office with so much zeal and success that he became one of the most popular preachers of his day. In 1552 he was appointed chaplain to Edward VI. That amiable prince died in the following year, and under the reign of his successor, the bloody Mary, Bradford at once became a marked man. On some shallow pretext he was confined to the Tower, brought to trial, and condemned to death. The Roman Catholics, knowing his popularity, would fain have gained him over to their side, but he remained inflexible. His life is said to have been offered to him if he would only promise to refrain from preaching, but even this he had the manliness to refuse, and popish bigotry did its worst by burning him at the stake in Smithfield in 1555. Two sermons and a Treatise on Repentance are his best known works.

BRADLEY, JAMES, a celebrated astronomer, was born at Sherborne, England, in 1692. He studied theology at Oxford, and took orders; but his taste for astronomy soon led him to change his course of life. His uncle instructed him in the elements of mathematics, his own industry did everything else, and, in 1721, he was appointed professor of astronomy at Oxford. Six years afterwards he made known his discovery of the aberration of light. But although this discovery gave a greater degree of accuracy to astronomical observations, and although the discrepancies of different observations were much diminished, yet slight differences remained, and did not escape his observation. He studied them during eighteen years with the greatest perseverance, and finally discovered that they were fully explained by the supposition of an oscillating motion of the earth's axis, completed during a revolution of the moon's nodes, that is, in eighteen years. He called this phenomenon the *nutation of the earth's axis;* and published in 1747 (Philosoph. Trans. No. 485) his account of the apparent motion of the fixed stars, with its laws, arising from this phenomenon of nutation. D'Alembert afterwards explained the physical causes of this phenomenon, upon the principle of the universal attraction of gravitation. By these two discoveries astronomers were, for the first time, enabled to make tables of the motions of the heavenly bodies with the necessary accuracy. Bradley had already, in 1726, explained the method of obtaining the longitude by means of the eclipse of Jupiter's first satellite. In 1741, at the death of Dr. Halley, he received the office of astronomer royal, and removed to the observatory at Greenwich. Here he

spent the remainder of his life, entirely devoted to his astronomical studies, and left thirteen volumes folio of his own observations in manuscript. Of these, the first volume was published by Horesby, 1798. The whole appeared under the title of Astronomical Observations made at the Observatory at Greenwich, 1750–62 (Oxford, 1805, two vols. folio). From this rich mine have been taken thousands of observations on the sun, moon, and planets, which, properly arranged, have brought our astronomical tables to great accuracy. It was from this that Mayer drew the elements of his celebrated tables of the moon. In addition to his merit as a man of science, Bradley was modest, benevolent, humane, and generous in private life. He died in 1762, aged seventy.

BRADSHAW, JOHN, president of the High Court of Justice which tried and condemned Charles I. He studied law in Gray's Inn, and obtained much chamber practice from the partisans of the Parliament, to which he was zealously devoted. When the trial of the king was determined upon, the resolute character of Bradshaw pointed him out for president, which office, after a slight hesitation, he accepted. His deportment on the trial was lofty and unbending, in conformity to the theory which rendered the unhappy sovereign a criminal, and amenable; and everything was done, both for and by him, to give weight and dignity to this extraordinary tribunal. He rendered himself obnoxious to Cromwell, when the latter seized the protectorate, and was deprived of the chief-justiceship of Chester. On the death of Cromwell, and the restoration of the Long Parliament, he obtained a seat in the council, and was elected president. He died in 1659, and on his death-bed asserted that, if the king were to be tried and condemned again, he would be the first to agree to it. He was magnificently buried in Westminster Abbey, whence his body was ejected, and hanged on a gibbet at Tyburn, with those of Oliver and Ireton, at the Restoration.

BRADY, NICOLAS, born in 1659 at Bandon, in Ireland, was educated at Westminster School, and afterwards studied at Oxford. His father was a Royalist officer, but he adopted a different line of politics, and distinguished himself by a zealous advocacy of the principles which, successfully carried out, expelled the Stuarts, and effected the revolution of 1688. Trinity College, Dublin, rewarded his zeal by giving him the degree of D.D. and other appointments; among others the rectory of the church of St. Cree, London, and put him in possession of an income which might, but does not seem to have sufficed for his wants, as he thought it necessary to increase it by keeping a school at Richmond in Surrey. His largest work, a translation of the Æneid, has passed into oblivion, but he has made his name a kind of household word, at least in England, by executing, in concert with Nathan Tate, that version of the Psalms which is in common use in the Episcopal Church. He died in 1726.

BRAGA, a town in Portugal, capital of the province of Minho, and the seat of an archbishop who is primate of Portugal, is charmingly situated on a rising ground between the Cavado and D'Este, about 32 miles N.N.E. of Oporto. It is surrounded by walls flanked with towers, and defended by a castle. The houses are old, the streets broad, but not well laid out. It contains seven squares, an archiepiscopal palace, a richly ornamented Gothic cathedral of the thirteenth century, seven parish churches, several monasteries, a college, &c. The manufactures are of some importance, and consist of hats, shoes, ironware, jewellery, woollen and linen cloth. Besides weekly markets Braga has two annual fairs. Braga is supposed to have been founded by the Carthaginians. It was called *Bracara Augusta* by the Romans, and there still exist remains of a Roman temple, amphitheatre, and aqueduct. On a hill 1 mile E. of the town stands the famous sanctuary Bom Jesus do monte. Pop. 20,000.

BRAGANZA, or BRAGANÇA, one of the oldest towns of Portugal, capital of the province Tras-os-montes. From its dukes the present reigning family of Portugal are descended. The town and surrounding district still belong to the King of Portugal as Duke of Braganza. Pop. 5000. See PORTUGAL.

BRAHAM, JOHN, a celebrated tenor singer, of Jewish extraction, was born in London in 1774, and made his first appearance as a vocalist at the age of ten. On attaining manhood he proceeded to France and Italy with the view of improving himself in his art, and accomplished this so successfully, that on his return he soon rose to the position of the first English singer of his day. He excelled mainly in national songs, such as 'The Bay of Biscay, O,' and 'The Death of Nelson,' and, till within a few years of his death, he continued to appear in public. He died on 15th February, 1856. His sons, Charles, Augustus, and Hamilton, are well known as distinguished vocalists.

BRAHE, TYCHO DE. See TYCHO.

BRAHILOW, BRAILOW, or BRAILA, a town in Walachia, formerly a fortress, on the northern bank of the Danube, with 15,767 inhabitants. It is situated at the confluence of the Sireth and the Danube, which divides itself here into a number of arms, one of them forming the harbour of the town. From this place much grain, raised in Walachia, is sent to Constantinople. The fishery of sturgeon in the Black Sea, carried on from Brahilow, is considerable. In the Turkish wars of the latter half of the eighteenth century Brahilow was several times besieged and taken by the Russians. In 1828 it had to surrender to the Russians after a gallant resistance, but in the following year the Peace of Adrianople restored it to the Turks.

BRAHMA, the first person in the Triad, or Trimurti, of the Hindoos, consisting of *Brahma*, the creator, *Vishnu*, the preserver or redeemer, and *Siva*, the destroyer. He is represented with four heads and as many arms, and the swan is consecrated to him. His name signifies *knowledge of the laws*, in allusion to his creative power. He is the god of the fates, master of life and death, and, by some, has been represented as the supreme eternal power; but he is himself created, and is merely the agent of the Eternal One. He is believed to die, according to some, annually, or, according to others, after a longer period, and to rise again. His character is no better than that of the Grecian Zeus. He is considered as the author of the Vedas, and as the lawgiver and teacher of India. The worship of Brahma is regarded as the oldest religious observance in that country. For a more particular account, see INDIA—Mythology.

BRAHMANS, the first of the four castes of the Hindoos. They proceeded from the mouth of Brahma, which is the seat of wisdom. They form the sacred or sacerdotal caste, and its members have maintained a more absolute and extensive authority than the priests of any other nation. Their great prerogative is that of being the sole depositaries and interpreters of the Vedas, or sacred books. There are seven subdivisions of the Brahmans, which derive their origin from seven penitents, personages of high antiquity and remarkable purity, who are said to have rebuked the gods themselves for their debaucheries. The great body of the Brahmans pay equal veneration to the three parts of the mysterious trinity, but some attach themselves more particularly

to one person of the triple godhead. Thus the Vishnuvites are distinguished by an orange-coloured dress, and the mark called *nama* on their foreheads. The devotees of Siva wear the *lingam*, and are distinguished from the former by their great abstemiousness. A Brahman should pass through four states. The first begins at about seven, when the duty of the young novice, or *Brahmachari*, consists in learning to read and write, studying the Vedas, and becoming familiar with the privileges of his caste, and all matters of personal purity. Thus he is taught his right to ask alms, to be exempted from taxes, from capital and even corporal punishment. Earthen vessels belonging to Brahmans, when used by profane persons, or for certain purposes, must be broken. Leather and skins of animals, and most animals themselves, are impure, and must not be touched by them. Flesh and eggs they are not allowed to eat. The Brahman is also taught to entertain a horror of the defilement of the soul by sin; and rules for purification by ablution, penances, and various ceremonies, are prescribed. The second state begins at his marriage, when he is called *Grihastha*. Marriage is necessary to his respectability. His daily duties become more numerous, and must be more strictly performed. Regular ablutions, fasting, and many minute observances, become requisite. The Brahmans, however, engage in secular employments, political, commercial, &c. The third state is that of the *Vana-Prasthas*, or inhabitants of the forest, which is now, however, seldom reached. They were honoured by kings, and respected even by the gods. Retiring to the forest, green herbs, roots, and fruit were their food: reading the Vedas, bathing morning, noon, and evening, and the practice of the most rigorous penances were prescribed. 'Let the Vana-Prastha,' says Manu, in the Institutes, 'slide backwards and forwards on the ground, or stand the whole day on tip-toe, or continue rising and sitting down alternately; in the hot season, let him sit exposed to five fires; in the rain, let him stand uncovered; in the cold season, let him wear wet garments; then, having stored up his holy fires in his mind, let him live without external fire, without a shelter, wholly silent, and feeding on roots and fruit. When he shall have thus become void of fear and sorrow, and shaken off his body, he rises to the divine essence.' The fourth state is that of a *Sannyasi*, in which new and severer penances are to be performed. Suppressing the breath, standing on the head, and other such ceremonies are performed, till the devout patient rises to a participation of the divine nature. The sanctity and inviolability of a Brahman are maintained, in the eyes of his countrymen, by the most severe penalties. The murder of one of the order, robbing him, &c., are inexpiable sins: the killing of his cow can only be expiated by a painful penance. To some travellers it appears that the number of Brahmans respectable for knowledge and virtue is very small; that the great body of them are devoted to ambition, intrigue, and voluptuousness, and that their character is disgraced by avarice, meanness, and cruelty. Their charity extends only to those of their own caste. The objects of their worship, besides their innumerable gods, are almost every species of animals, and a variety of malignant demons. The transmigration of souls is one of their essential doctrines, and they believe in the existence of a hell. Some of the ceremonies of the Brahmanical worship are horrible: some are more licentious than the orgies of Bacchus. The sacrifices commonly consist of vegetables, but animals are sometimes sacrificed. See INDIA—Mythology.

BRAHMAPOOTRA, or improperly BURRAMPOOTER, is the largest river in India. Its sources, not yet explored, seem to be situated near Lake Manasarovara, in Thibet, near those of the Indus. In Thibet it is called the Sanpoo, flows by Lassa, the residence of the Grand Lama, and, after being lost to European knowledge, reappears in Assam. In its rise and fall, its periods coincide nearly with those of the Ganges. Its navigation is rendered difficult by shifting sand-banks, and trunks of trees sticking in its bed. After entering Bengal it joins the Ganges at Luckipoor, where the united rivers form a wide gulf, communicating with the Sea of Bengal. The course of the Brahmapootra is estimated at about 1800 miles. Rising from opposite sides of the same mountains, and separating to a distance of 1200 miles, the Brahmapootra and the Ganges are destined to mingle their waters again in the same channel.

BRAIDWOOD, THOMAS. See DEAF AND DUMB.

BRAILA. See BRAHILOW.

BRAILS, certain ropes passing through pulleys on the mizzen-mast (see SHIP), and afterwards fastened in different places, on the hinder edge of the sail, in order to draw it up to the mast, as occasion requires. *Brails* is likewise a name given to all the ropes employed to haul up the bottoms, lower corners, and skirts of the great sails in general. The operation of drawing them together is called *brailing* them up, or hauling them up to the *brails*.

BRAIN. The brain is a soft substance, partly reddish-gray, and partly whitish, situated in the skull, penetrated by numerous veins, and invested by several membranes. Democritus and Anaxagoras dissected this organ almost 3000 years ago. Haller, Vicq d'Azir, and other anatomists in modern times, have also dissected and investigated it without exhausting the subject. Between the skull and the substance of the brain three membranes are found. The outer one is called the *dura mater*. This is strong, dense, and elastic. It invests and supports the brain. The next which occurs is the *tunica arachnoidea*. This is of a pale white colour, yet in some degree transparent, very thin, and in a healthy state exhibits no appearance of vessels. The membrane below this is called the *pia mater*. It covers the whole surface of the brain. It is very vascular, and a great portion of the blood which the brain receives is spread out upon its surface in minute vessels. The brain consists of two principal parts, connected by delicate veins and fibres. The large portion, the *cerebrum*, occupies, in man, the upper part of the head, and is seven or eight times larger than the other, the *cerebellum*, lying behind and below it. It rests on the bones which form the cavities of the eyes, the bottom of the skull and the *tentorium*, and projects behind over the cerebellum. On the whole exterior of the cerebrum there are convolutions, resembling the windings of the small intestines. The external reddish substance of the brain is soft and vascular, and is called the *cortical* substance; the internal is white, and is called the *medullary* substance of the brain. This medulla consists of fibres, which are very different in different parts. The cerebellum lies below the cerebrum, in a peculiar cavity of the skull. By examining the surface it is seen to be divided into a right and left lobe, by the spinal marrow lying between, but connected at the top and bottom. Like the cerebrum, it is surrounded by a vascular membrane, reddish-gray on the outside, and composed of a medullary substance within. In proportion to its size, also, it has a more extensive surface, and more of the vascular membrane than the cerebrum. In a horizontal section of it, we find parallel curved portions of the cortical and the medullary substances alternating with each other. Between the cortical and the medullary substance there is always found, in the cerebellum, a third intermediate

yellow substance. All the medulla of the cerebellum is also united in the middle by a thick cord. Experience teaches that, in the structure of the brain, irregularities are far more uncommon than in other parts of the human body. It is worthy of observation, that every part of the brain is exactly symmetrical with the part opposite. Even those which lie in the middle, and are apparently single (the spinal marrow, for instance), consist, in fact, of two symmetrical portions. Twelve pairs of nerves proceed from the brain, including the nerves for the organs of smell, of sight, of hearing, and of taste, also those for the skin and muscles of the face, those for the cavity of the mouth and for the larynx. The chemical constituents of the brain may be divided into three classes. The first class includes water and the salts, chloride and carbonate of soda and of potash, and phosphates and carbonates of lime. The second class includes cholesterine, oleine, and other principles the nature of which has not yet been determined. To the third class belongs, so far as has yet been ascertained, only the cerebral albumen. When compared with the brain of other animals, the human brain presents striking differences. Even the brain of the higher classes of the inferior vertebrate animals differs from that of man, especially in the degree of development, while among the lower grades there is sometimes, properly speaking, no brain at all, but only nerve ganglia, which correspond to the brain. In size, also, the brain of the lower animals, although sometimes (as in the elephant) actually greater, is always much less when compared with the size of the whole body, and it is found that the size of the brain proportionally to the size of the body is a direct measure of the intelligence of different animals. In man the brain weighs from 2 to 3 lbs., or about $\frac{1}{3}\frac{1}{5}$th of the weight of the body; in the dog the average weight is about $\frac{1}{1}\frac{1}{0}$th of the animal; in the horse $\frac{1}{4}\frac{1}{0}$th; and in the sheep $\frac{1}{7}\frac{1}{0}$th. Another difference between the brain of man and that of other vertebrate animals is, that in the latter the front part comes much further forward than it does in man. The brain attains its highest degree of development earlier than any other part of the body. In old age it loses both in bulk and in weight. As to its function, the brain is, generally speaking, the natural representative of the mind. All the intellectual faculties—thinking, volition, sensation—can be put in activity only by means of the organization of the brain. Nothing definite is known of the function of the separate parts of the brain. Nevertheless, from the earliest down to the latest periods, it has been attempted to find the seat of the mind in separate parts of the brain, and different parts have been arbitrarily fixed upon by different individuals. At the same time it is not to be denied that separate functions belong to certain parts of the brain; but all that has as yet been made out with regard to this is, that the parts of the brain lying in front have functions connected with the intellectual part of man's nature; while the parts lying nearer the back of the head belong more to our merely animal or organic nature. See PHRENOLOGY.

As the central organ of the nervous system the brain is sympathetically affected in nearly all cases of acute disease. The feeling of pain itself can arise only through the brain, and in cases of painless disease, when the parts attacked are furnished with nerves, the brain is nearly always affected and prevented from perfectly performing its functions, unless the affection is overcome by an exercise of will. Even delirium is in most cases only the consequence of other diseases. Among the diseases of the brain, properly so called, are those cases in which disturbances take place in the anatomical structure of the brain, and also those in which the functions of the brain are seen to be disordered, although it may be impossible to point out any anatomical disturbance as the cause of this disorder of the functions. To the latter belong hypochondria, melancholia, mania, and other mental diseases. Epilepsy, hysteria, St. Vitus' dance, catalepsy, tetanus, hydrophobia, &c., may also be referred to the same class. To the other class of diseases, those in which its anatomical structure is disturbed, belong all cases of poverty or plethora of blood in the brain. With regard to these it is worthy of notice that both these causes, although opposite in themselves, may produce the same symptoms, giddiness, headache, &c. Inflammation of the membranes of the brain, accompanied by profuse perspiration, is a form of brain disease which is especially dangerous on account of the pressure it causes on the brain itself. This disease (meningitis) seldom occurs without the substance of the brain also being affected, in which case what is called phrenitis, or acute inflammation of the brain, ensues. Softening of the brain is sometimes the result of chronic inflammation of the brain, and in this case there is always a diminution of mental vigour as well as a loss of power over the body. Chronic inflammation is also apt to lead to the formation of abscesses on the brain, owing to the accumulation of pus. Defective nourishment of the brain is comparatively rare, and is usually the accompaniment of hydrocephalus from birth, being caused by the pressure of the water on the substance of the brain.

BRAINE-LE-COMTE, a small and ancient town in Belgium, province of Hainaut, 34 miles S.S.W. Brussels; containing a handsome church, founded in the thirteenth century, and a large well-built château. The Southern Railway branches off from this town, on the W. side to Mons and Quiévrain, E. to Namur and Charleroi. Amongst its public works are breweries, wire-works, dyeworks, oil, cotton, and corn mills. At one time it manufactured and dealt extensively in tin wares, but this branch of trade is almost if not entirely extinct. Pop. 6464.

BRAINERD, DAVID, the celebrated missionary, was born in April, 1718, at Haddam, Connecticut. In the spring of 1742 he began the study of divinity, and at the end of July he was licensed to preach, for which a thorough examination had shown him qualified. He had for some time entertained a strong desire of preaching the gospel among the heathens, which was gratified by an appointment as missionary to the Indians from the Society for Propagating Christian Knowledge. In 1744 he was ordained by a presbytery at Newark, New Jersey, and took up his habitation near the forks of the Delaware, in Pennsylvania, where he resided for a year, during the course of which he made two visits to the Indians on the Susquehannah River. His exertions, however, were attended with little success, until he went to the Indians at Crossweeksung, near Freehold, in New Jersey. Before the end of a year a complete reformation took place in the lives of the savages, seventy-eight of whom he baptized within that time. They became humble and devout; and it was not unusual for the whole congregation to shed tears and utter cries of sorrow and repentance. In 1747 he went to Northampton, in Massachusetts, where he passed the short residue of his life in the family of the celebrated Jonathan Edwards. He died in 1747, after great sufferings. He published an Account of the Rise and Progress of a Remarkable Work of Grace among a Number of Indians in New Jersey and Pennsylvania, 1746.

BRAKE. See FERN.

BRAKENBURG, REGNER, a well-known Dutch painter, distinguished for his rustic scenes, family

pieces, &c., was born at Haarlem, in 1649. His pictures are very carefully finished, and exhibit freshness and excellence of colouring, but the drawing is somewhat defective. He worked for a long time in Friesland, and died at Haarlem in 1702.

BRAMAH, JOSEPH, the inventor of the Bramah lock, the Bramah press, &c., born at Stainborough, in Yorkshire, in 1749; died in 1814. He was first apprenticed to a carpenter and joiner, but finally set himself up in business in London as manufacturer of various small articles in metal work. His future life was distinguished by a long series of ingenious inventions, many of which have been found of great utility. Besides those already mentioned, he was the inventor of the apparatus used in public-houses to bring liquids from the cellar to the counter, of a printing-machine which has been adopted by the Bank of England to number its notes; and he was also the improver of fire-engines, steam-engines, the manufacture of paper, &c.

BRAMAH SAFETY-LOCK, an ingeniously constructed lock, invented in 1784 by the English mechanician Bramah. The arrangement on which the security of the lock depends consists in a number of thin metal plates called sliders (generally six in number), the notches in which must simultaneously be brought into a certain position in order to render possible the movement of a bar which allows the lock to be shut or opened. This lock was called by the makers of it the 'impregnable,' and for some time it was thought that it could not be picked. The Messrs. Bramah, successors of the inventor, went the length of offering a reward of £200 to any one who should succeed in opening it in thirty days, without having seen the key. The challenge was accepted by an American, Mr. Hobbs, who won the reward by opening it in sixteen days, after fifty-one hours' labour, and this too without in the slightest degree injuring its delicate mechanism.

BRAMAH'S PRESS. See HYDRODYNAMICS.

BRAMANTE OF URBINO, FRANCESCO LAZZARI, shares with Brunelleschi the credit of being the restorer of architecture. He was born at Castel Duranti, in the duchy of Urbino, in 1444. He applied himself first to painting; but his passion for architecture soon gained the ascendency. At length he went to Milan, and there his whole time was spent at the cathedral. Pope Alexander VI. named him his architect, and Julius II. made him superintendent of his buildings. At the command of the latter he united the Belvidere with the palace of the Vatican. He persuaded the pope to order the Church of St. Peter to be torn down, and another to be erected in its place, which should not have its equal in the world. In 1513 the foundation of this edifice was laid, according to the plan of Bramante. It yet remains the greatest production of modern architecture. Bramante died in 1514, without living to see this work completed. He had begun the edifice with incredible despatch; but his successors, Raphael, Julius of San Gallo, Peruzzi, and Michael Angelo, altered the original plan, and left nothing of Bramante's workmanship standing except the arches which support the tower of the dome. His writings, part prose part verse, first discovered in 1756, were printed the same year at Milan.

BRAMBLE (*Rubus fruticosus*), the name commonly applied to the bush with prickly stems which bears the well-known berries usually called in Scotland brambles, and in England blackberries. The name is sometimes applied to the raspberry also, a plant very similar to the ordinary bramble, and belonging to the same genus. The bramble belongs to the natural order Rosaceæ, and the sub-order Potentilleæ. It is rarely cultivated, but it is one of the commonest plants which grow wild in hedgerows, and when it is cultivated its fruit is improved both in quantity and quality. The flowers of the bramble do not appear till late in the summer, and the fruit, which is deep purple or almost black in colour, does not ripen till autumn. A kind of wine, of very good flavour, is made in England from its berries.

BRAMPTON, a market town, England, county Cumberland. The town, 9 miles N.E. of Carlisle, is irregularly built, but well paved and kept tolerably clean; amply supplied with water, well lighted with gas, and generally improving. It contains a handsome octagonal market-house, a church, and several other places of worship. Calico-weaving is carried on to a small extent. Pop. 2617.

BRAN, the husky part of wheat separated by the bolter from the flour. Its components are—water, 13; gluten, 19·5; fatty matter, 5; husk with starch, 55; and ashes, 7·5; but the results of different analyses vary considerably. It is employed in feeding cattle, more especially when it forms only one of the ingredients in the feeding-trough; for although it contains much nitrogen, it is not very nutritious. It has also been found useful as a manure, and mixed with warm water it is used by calico printers for removing colour adhering to the parts of the fabric which have not been mordanted.

BRANCHIOPODA, a division of crustacea of the division Entomostraca. They are for the most part microscopic, and are chiefly distinguished by having the gills attached to the legs, which are generally numerous. The body is sometimes naked, but more frequently is enveloped by a buckler, which in some covers only the head and thorax, and in others the whole body. Some have two or even three eyes, but a greater number have one only. They are all free and continually in motion. Among the Branchiopoda are the water-fleas and brine-shrimps, and some also rank the trilobites among them.

BRANCHIOSTOMA, or LANCELET, also called *Amphioxus*, from its being sharp at both ends, a small fish about 2 inches long, of a very anomalous character, and forming a kind of link between the highest and some of the very lowest of animal forms. Though a vertebrate, it has no brain, and though a fish, it breathes like a mollusc, and has a circulation resembling that of an annelid. It was first discovered on the coast of Cornwall towards the latter part of the last century, and has since been taken in the Mediterranean and on the west coast of Scotland. Its remarkable configuration has attracted the attention of several distinguished anatomists and physiologists.

BRAND is a provincial name for certain diseases of cereals, applied generically. Thus bunt is called *pepper-brand*, and smut is called *dust-brand*. The term is always applied in Germany to the disease commonly called *bunt* in this country, which word is most probably a corruption of *bunt* or *burnt ear*. The word has also been applied to the circular, brown, and apparently scorched spots which are so common on leaves, especially in greenhouses and in frames. It has been supposed that this arose from the concentration of the rays of light, by which the leaves were actually scorched; but this scarcely appears possible, especially when it is considered that the lenses of water thus formed on the leaves are plano-convex.

BRANDENBURG, a province of Prussia, surrounded mainly by Mecklenburg and the provinces of Pomerania, Posen, Silesia, and Prussian Saxony. The soil consists in many parts of barren sands, heaths, and moors; yet the province produces much grain, as well as fruits, hemp, flax, tobacco, &c., and supports many sheep. The forests are very exten-

sive. The principal streams are the Elbe, the Oder, the Havel, and the Spree; but the first two merely skirt the territory. Brandenburg carries on an active trade in manufactured articles, and is well situated for commerce, since it has many canals, rivers, good roads, and is intersected by the railways from Berlin to Leipzig, &c. The province of Brandenburg includes, besides some other districts, the greater part of the former Mark of Brandenburg, which formed the cradle of the Prussian monarchy, and the centre round which the present extensive kingdom has grown up. It is divided into the three administrative divisions of Berlin, Potsdam, and Frankfort, and has a total area of 15,600 square miles, with a pop. (on the 1st of Dec. 1871) of 2,863,461. Most of the inhabitants are Lutherans; the rest are chiefly Roman Catholics and Jews. From 1685 to 1688 many French refugees, Walloons, and inhabitants of Lorraine and of the Palatinate, settled in the Mark. At present Brandenburg is the most important of the Prussian provinces, including as it does the capital (Berlin), and the governments of Potsdam and Frankfort. The first people who are known to have inhabited Brandenburg were the Suevi. They were succeeded by the Slavonians, a barbarous people, whom Henry I. conquered and converted to Christianity in the early part of the tenth century. The government was first conferred on a Saxon count, and did not become hereditary till the time of Albert, whose son was raised to the dignity of elector in 1100. This race becoming extinct, Charles IV. assigned the electorate to his son Sigismund, who became emperor in 1415, and sold the region to Frederick, burgrave of Nürnberg, the ancestor of the present reigning family. Frederick William the Great made various accessions to the territories of his ancestors, and obliged the King of Poland, in 1656, to declare Prussia an independent state. The Old Mark was ceded to Napoleon in 1807, and formed part of the Kingdom of Westphalia; but it was restored to Prussia in 1814. The Elector of Brandenburg held the seventh rank among the electors of the empire, and had five votes in the council of princes.

BRANDENBURG, capital of the province of the same name (which see), on the Havel, 35 miles W. of Berlin, formerly the residence of the reigning family of Prussia. It is divided by the Havel into an old and a new town, both walled, the former having narrow and crooked streets, the latter wide and straight. It has a castle, a cathedral church, a gymnasium, &c. Its manufactures are woollens, linens, spirits, beer, leather, &c. It contained, in 1871, 25,828 inhabitants.

BRANDING, a form of punishment once in use for various crimes, but abolished by 3 Geo. IV. cap. 38. It was performed by means of a red-hot iron, and the part which was branded was the cheek, the hand, or some other part of the body. When the practice of arresting judgment in criminal cases by Benefit of Clergy was in force, it was customary to brand on the left thumb any layman who received this benefit, since it was not permitted to a layman to enjoy it more than once. Even after branding had been abolished in all other cases it was for a long time retained in the army as a punishment for desertion, the letter D being marked on the left side of a deserter 2 inches below the armpit. It was not, however, properly speaking, branded on his side, but marked with ink, gunpowder, or some other substance which would leave a stain that could not be obliterated without destroying the skin at the part. This also has been abolished.

BRANDIS, Christian August, a distinguished German philologist and historian of ancient philosophy, born at Hildesheim in 1790; died at Bonn, July 24, 1867. After a course of philological and philosophical studies at Kiel and Göttingen, he entered upon his academical career at Copenhagen in 1812, where he graduated as Ph.D., and for a short time delivered lectures on philosophy. He then removed to Berlin, where he again established himself as lecturer on philosophy; but he had scarcely begun his course of lectures when he was induced by Niebuhr in 1816 to accompany him to Rome as secretary to the Prussian embassy. From 1819 to 1821 he was engaged in conjunction with Immanuel Bekker in collecting materials for a new edition of Aristotle, which was published in four vols. at Berlin (1831–36). In 1821 he was appointed ordinary professor of philosophy at Bonn, and his professional duties at this university were continued during the rest of his life, being only interrupted by a residence of three or four years in Greece, where he was acting as councillor to King Otho. After his return from Greece he published an interesting and instructive work, for which his residence in that country had furnished him with materials, entitled Mittheilungen über Griechenland (Communications on Greece), Leipzig, 1842, and at the same time resumed his professorship at Bonn. His two most important works are his Handbuch der Geschichte der Griech.-Röm. Philosophie (Handbook of the History of Greek and Roman Philosophy), Berlin, 1835–60; and Geschichte der Entwickelungen der Griech. Philosophie (History of the Developments of Greek Philosophy), Berlin, 1862–64.

BRANDON, a market town, county Suffolk. The town is pleasantly situated on the Little Ouse or Brandon, over which is a neat stone bridge. Gunflints were wont to be extensively manufactured here, and a considerable trade is carried on in corn, malt, coals, bricks, iron, and timber. The extensive rabbit-warrens in the neighbourhood afford large supplies to the London market. The Duke of Hamilton and Brandon takes the latter title from this place. Pop. 2116.

BRANDT, Gerhard, a celebrated Arminian divine, born at Amsterdam in 1626, after completing his studies and making himself a thorough Hebrew and Greek scholar, became pastor of the Remonstrants, first at Nieukoop and afterwards at Amsterdam, and died there in 1685. His works, almost all written in Dutch, include a Life of Admiral Michel Ruyter, which has been translated into French; a Narrative of the Trial of Barneveld, Hoogerbeets, and Grotius; and a History of the Reformation. The last work, on which his fame chiefly rests, has been translated into English. It is remarkable for the elegance of its style, but is written too much in the spirit of partizanship.

BRANDT, Nicholas or Sebastian, a German chemist of the seventeenth century, usually considered the discoverer of phosphorus. Leibnitz mentions him as a chemist of Hamburg, who, during a course of experiments on urine, for the purpose of discovering a solvent which would convert silver into gold, accidentally produced phosphorus, in 1667 or 1669. He communicated or sold his discovery to Kunkel, who showed it to Leibnitz. Boyle, having got a piece of the phosphorus, and knowing from what material it had been obtained, after various experiments succeeded in preparing it, and thus made an independent discovery of the method.

BRANDT, Sebastian (named *Titio*), born at Strasburg in 1458; died there in 1520. He studied law at Basel, where he took his degree, and delivered lectures on this science for many years with great applause. He was still more distinguished for his poetical talents, and the Emperor Maximilian I. invited him several times to his court.

He has immortalized himself by a poem called the Ship of Fools, or the Ship from the Land of Folly, which satirizes the crimes and follies of his age, first published at Basel, 4to (without date). Four editions appeared in one year. It has since been repeatedly printed and translated into all the languages of Europe. In Germany it was for about a century truly a national book, so well known and esteemed by all classes that the celebrated preacher Geiler of Kaisersberg delivered public lectures upon it from the pulpit at Strasburg. In this work we find a collection of moral instructions and satires upon the crimes, vices, and abuses common both in public and private life. The book is divided into a hundred and thirteen chapters, which, however, have no connection with each other. The descriptions are not in general poetic, but still contain many happy and beautiful passages, often display learning, and not seldom vigour; and the Ship of Fools will always be a valuable book, full of sound reasoning, pure morality, clear and bold thoughts, and knowledge of mankind. There is an imitation, and partly a translation, by Alexander Barclay. See BARCLAY (ALEXANDER).

BRANDY, the name most commonly applied to the spirit distilled from the juice of the grape, but also given to liquors distilled from other fruits, such as cherries, peaches, &c. All these brandies differ from each other only in the essential-oil which they contain, and which gives to each its different flavour and aroma. When brandy is rectified by repeated distillation, the essential-oil and the water it contains are given off, and it becomes pure alcohol. It is colourless at first, but usually derives a brownish colour from the casks in which it is kept, or as is often the case, it is coloured by means of burnt sugar or other colouring matters. The best brandy is that made in France, the stronger and harsh wines being those that are used in its manufacture. The brandies of Cognac and Armagnac have the highest repute. A large quantity of what is called French brandy, and is exported from France, is not really brandy at all, but consists of whisky or other spirits flavoured and coloured to resemble the genuine article. Whisky, rum, potato spirit, and beet-root spirit, are those that are generally used for this purpose. Brandy is often taken medicinally, being used in cases of diarrhœa, and as a tonic and stimulant. In 1870 7,942,965 gals. of brandy were imported into the United Kingdom, value £2,153,699; in 1871 the quantity was 5,228,568 gals., the value £1,895,378. The duty on it is at present 10*s.* 5*d.* the gallon. For the distillation of brandy see DISTILLATION.

BRANDYWINE CREEK, a small river which rises in the state of Pennsylvania, passes into the state of Delaware, and after a course of about 45 miles joins the Christiana, 2 miles below Wilmington. It abounds in favourable sites for the application of water-power; and the Brandywine flour-mills form the finest collection of the kind in the United States.—This river is noted for giving name to a battle fought near it, Sept. 11, 1777, between the British and Americans, in which the latter were defeated.

BRANK, or BRANKS, an instrument formerly in use in Scotland, and to some extent also in England, as a punishment for scolds. It consisted of an iron frame which went over the head of the offender like a common horse-bridle, and had in front an iron plate, which was inserted in the mouth, where it was fixed above the tongue, and kept it perfectly quiet. Such instruments are still to be seen preserved in several of the museums and churches of England and Scotland, among others in the Antiquarian Museum at Edinburgh, and St. Mary's Church, St. Andrews.

BRANTÔME, PIERRE DE BOURDEILLES, LORD OF THE ABBEY OF, was born at Perigord, in Gascony, about 1540; died in 1614. In his epitaph, composed by himself, he relates in a vaunting manner how he first bore arms under the great Francis of Guise, and afterwards served the king, his master. After the death of Charles IX. he withdrew to his estates, and wrote his memoirs, which have a great deal of vanity and self-complacency, mingled with much that is interesting. They are a living picture of his age; for Brantôme was personally acquainted with all the great characters of the time, and an eye-witness of all the important events which then took place, and in some was an actor. Brantôme's character was that of his native province and of his rank. He was a courtier, regardless of right or wrong; who does not blame the great, but observes and relates their faults and crimes as ingenuously as if he were uncertain whether they deserve praise or blame; as indifferent about honour and chastity in women as about integrity in men. He describes a scandalous act without being sensible of its offensiveness. He speaks of the *good* King Louis XI., who ordered his brother to be poisoned, and of the *virtuous* ladies whose adventures no pen but his own could describe. He places us in the middle of that century when expiring chivalry was contending with the forming, and as yet unsettled manners of later times. Brantôme, in the midst of his wandering life, had acquired more learning than most of his fellow soldiers. He has left Vie des Hommes illustres et des grands Capitaines Français; Vie des grands Capitaines Etrangers; Vie des Dames illustres; Vie des Dames galantes; Anecdotes touchant les Duels; Rodomontades et Jurements des Espagnols. Twelve editions of his works were published from 1676 to 1740, sometimes entire, sometimes in selections.

BRASENOSE, one of the colleges of Oxford University, founded by William Smith, bishop of Lincoln, and Sir Richard Sutton, in 1509. The origin of the name is unknown. According to tradition, it is a corruption of 'Brewing-house.' On the other hand, Sir Anthony Wood states that it got its name from having been built out of the ruins of several college hostels, the chief of which was called Brasenose Hall, its sign being a nose of brass. The college is very rich in endowments, which, however, were till recently subject to many restrictions. By the commissioners appointed under the Oxford University Act of 1854, these restrictions were entirely removed, and some further changes were made as to the manner in which the endowments of the college were to be applied. Brasenose has now fifteen fellowships, besides numerous scholarships and exhibitions. The number of members on the books in 1872 was 492.

BRASIDAS, a Spartan general who distinguished himself in the first half of the Peloponnesian war by his courage and his military skill. After repelling the attack of the Athenians on the fortress of Methone, he was elected by his fellow-countrymen to be the leader of an expedition intended for Thrace. The numerous colonies and allies of the Athenians in that part nearly all went over to the Spartans, after the arrival of Brasidas, and the former were obliged to despatch two armies to Thrace to oppose him. Cleon, the leader of the second army, allowed himself to be drawn into a battle at Amphipolis, and was totally defeated, he himself being in the number of the slain (B.C. 422). But the Spartan victory was purchased with the loss of their general, who received a fatal wound during the engagement. The inhabitants of Amphipolis paid divine honours to him after his death.

BRASS. Copper and zinc unite in several pro-

portions, forming alloys of great importance in the arts. The best brass consists of two parts by weight of copper to one of zinc; and when the latter is in greater proportion, compounds are formed called *tombac*, *Dutch gold*, and *pinchbeck*. The advantages which lead to the extensive use of this alloy in the arts consist in its bright yellow colour, its hardness, and the facility with which it is cast. On the other hand, ordinary British brass, composed as stated above, is not malleable when hot, and therefore all articles made from it must either be cast or turned. In order to remove this disadvantage, an alloy has been made differing from the ordinary British brass, by having a larger proportion of zinc, which has the effect of producing a compound combining all the valuable qualities of brass with the property of being malleable when hot. The proportions in this case are about three parts of copper to two of zinc. Brass is sometimes mixed with about two per cent. of lead to enable it to be used more readily for work that requires to be turned or filed. The lead has the effect of hardening the brass, so that the turnings break short, and the tool is thus prevented from being clogged. In order to resist the action of the air on brass, it has to be covered with a coating of metal that is not so easily oxidized. The process is first to bring the brass to a clean face by repeated immersions in nitric acid, and then to cover it with an alcoholic solution of shellac. Generally more or less dragon's blood is added to this solution in order to vary the tint of the brass according to pleasure. *Brass foil*, also called *Dutch leaf*, and in German *ranschgold*, is made by beating out sheets of very thin brass containing a large proportion of copper. By this process leaves may be obtained not more than $\frac{1}{10000}$th of an inch in thickness. In this country brass is manufactured on a large scale, chiefly at Bristol and Birmingham in England, and at Holywell in North Wales. Brass was well known to the Romans under the name of *orichalcum*, who took advantage of its resemblance to gold in robbing the temples and other public places of that precious metal. Thus Julius Cæsar robbed the Capitol of 3000 lbs. weight of gold, and Vitellius despoiled the temples of their gifts and ornaments, and replaced them with this inferior compound.

BRASSES, Sepulchral or Monumental, large plates of brass inlaid in polished slabs of stone, and usually containing the figure of the person intended to be commemorated, either in a carved outline on the plate, or in the form of the plate itself. In England the latter mode of representing the figure was the more common, while the other mode was the prevailing one on the Continent. It was usual to add the coat of arms along with an inscription to the figure which occupied the main portion of the brass, and where the brass was cut out so as to represent by its outline the figure of the person commemorated, these additions were made on separate pieces of brass, fixed in the same slab of stone. Sometimes the figure was entirely wanting, and its place taken by an ornamented cross. It is not known how old the practice of laying down such monumental slabs is. The earliest that has come down to us is one at Stoke d'Abernon, in Surrey, which commemorates Sir John d'Abernon, who died in 1277; and the earliest on record is that of Simon de Beauchamp, who died at the beginning of the same century. Large numbers of these brasses were no doubt destroyed, along with many other monuments of ecclesiastical art, at the time of the Reformation, as well as during the wars of the Long Parliament; but those which have come down to us are of immense value in giving us an exact picture of the costume of the time to which they belong.

BRASSICA, a very important genus of cruciferous plants, including among its numerous species many of great economical value, as the cabbage, turnip, rape, &c. Owing to the numerous crossed races which have been produced in modern times, the limits of the species have been broken down, and often cannot easily be recognized.

BRAUN, August Emil, a German archæologist and writer on art, born at Gotha, August 19, 1809; died Sept. 12, 1856. He received his early education at his native town, and continued his studies at Göttingen. From 1832 to 1833 he resided at Dresden, whence he went to Rome in company with Gerhard, with whom he had formed a close intimacy. In the same year he was appointed first librarian and then assistant-secretary to the Archæological Institute, and in 1834 became editor of the Bulletino, and in 1837 of the Annali of that institution. His chief works are: Il Giudizio di Paride (The Judgment of Paris), 2d ed. Par. 1838; Die Kunstvorstellungen des Geflügelten Dionysos (The Artistic Representations of the Winged Bacchus), Munich, 1839; Antike Marmorwerke (Ancient Works in Marble), 1st and 2d decades, Leipz. 1843; Griech. Götterlehre (The Greek Doctrine of the Gods), Gotha, 1850–54; Die Vorschule der Kunstmythologie (The School of Art Mythology), Gotha, 1854, with 100 copperplate engravings, translated into English by Mr. Grant (Gotha, 1856); Die Ruinen und Museen Roms (The Ruins and Museums of Rome), Bruns. 1854, constituting an excellent guidebook for artists and antiquaries.

BRAUNSBERG, a town, Prussia, province of Eastern Prussia, and government of Königsberg, on the Passarge, about 4 miles from its junction with the Frische Haff, divided by the river into the old and new towns. It is the residence of the Bishop of Ermeland, and the seat of a royal court of justice; contains four Roman Catholic churches and one Protestant church; a Roman Catholic Lyceum, with theological and philosophical faculties; a gymnasium, and seminary for priests, with six professors; a normal school, an asylum, and three hospitals. It has some linen and woollen manufactures, and tanneries; and a considerable trade in yarns, grain, and ship-timber, the river being navigable for small vessels as far as the town. Pop. in 1871, 10,471.

BRAUWER, Adrian. See Brouwer.

BRAVI, the name formerly given in Italy, and particularly in Venice, to those who were ready to hire themselves out to perform any desperate undertaking. The word had the same signification in Spain, and both the word and the persons designated by it were found in France in the reign of Louis XIII. and during the minority of Louis XIV. At the end of the fifteenth century they are described as being armed to the teeth, with an arquebuse in their hands, a cutlass at their side, masked by a bushy beard and enormous moustaches, and wearing a long and thick forelock called a *ciuffo*, which they used to bring down over their face when they wished to conceal it entirely. The Bravo is the title of a Venetian story which is one of the best works of the American novelist J. Fenimore Cooper.

BRAVURA AIR, an air so composed as to enable the singer to show his skill in execution by the addition of embellishments, striking cadences, &c. It is sometimes used for the style of execution.

BRAXY, or Dysentery in Sheep, inflammation of the coats of the intestines. It is often preceded by diarrhœa, and attended by fever and constitutional disturbance. A sudden change of pasturage, more particularly from a succulent to a dry and high pasture, is one of the most frequent causes, and to this may be added exposure to wet and cold after travel-

ling. It is a much more serious disease than simple diarrhœa, and often becomes fatal in the course of a few days. The name is also applied to a blood disease resulting from plethora, which is considered by some to be the true braxy. In this case also a sudden change of pasturage is the most frequent cause of the disease, but the change which generally produces it is the reverse of that which produces the former, namely, a change from a low diet to rich and nourishing food. This disease is even more fatal than the former, and runs its course in a few hours. As there is no means of saving an animal which is once attacked, the only course is to avoid the causes which lead to the disease.

BRAY, a maritime town, Ireland, counties Dublin and Wicklow, on both banks of the Bray, which here forms the boundaries of these two counties, 12 miles S.E. of Dublin. The portion of the town in Wicklow stands on an acclivity, that on the Dublin side on a plain. It contains but one principal street, straight, but indifferently built. It has an extensive trade in brewing and malting. Pop. in 1871, 6086.

BRAY, SIR REGINALD, second son of Sir Richard Bray, one of Henry VI.'s privy-councillors, devoted himself to architecture, and stood high in the favour of Henry VII., for whom he is understood to have designed, if he did not actually execute, the beautiful chapel at Westminster which bears that monarch's name. Another of his works, and now his final resting-place, is the almost equally beautiful chapel of St. George's at Windsor. He died in 1503.

BRAZIL [French, *Brésil;* German, *Brasilien;* Italian, *Brasile*], a vast empire, South America, occupying a space nearly equal to one-half of that entire continent. It is of extremely irregular outline and varying dimensions; its greatest diameter being, E. to W., or from Cape Augustin (lat. 8° 21′ S.; lon. 34° 56′ W.) to the river Yavari or Jabary, which separates it from Peru, 2630 miles; and N. to S., from Cape Orange (lat. 4° 23′ N.; lon. 37° 27′ W.), E. of Oyapok Bay, to the river Tahim, E. from Lake Merim, 2540 miles; area roughly estimated at 3,650,000 square miles. It is bounded S.E., E., and N.E. by the Atlantic Ocean; N. by French, Dutch, and English Guiana, and Venezuela; W. and S.W. by Ecuador, Peru, Bolivia, Paraguay, and the Argentine province of Missiones, and by the Republic of Uruguay. Its entire coast-line, from the river Tahim or Itany (lat. 32° 45′ S.) to the head of the Bay of Oyapok (lat. 4° 0′ N.; lon. 51° 32′ W.), is upwards of 3700 miles. Throughout this vast extent of coast there are few great indentations; though in some parts smaller harbours and inlets are pretty numerous, many of the former excellent, and generally surrounded by flats. The principal bays, reckoning from the S. extremity of the empire, are, Ilha Grande, Rio Janeiro, St. Salvador or All Saints, on the S.E. coast; and St. Marcos, St. Jose, Pinzon, and Oyapok on the N. and N.E. coasts. The principal capes or headlands are, Capes Frio, St. Thome, Point St. Antonio, St. Augustin, St. Roque, on the S.E. and E. coasts; and Magoary, Norte, and Orange, on the N. coast.

General Description.—The appearance of the coast of Brazil is very different at different places. From the river Tahim to the island of Santa Catharina, a distance of about 400 miles, it is low, sandy, and intersected by the outlets of numerous lakes or lagoons, which skirt the shores throughout this whole extent. From this point, or from about lat. 27° 30′ S. to lat. 21° 45′ S., 700 miles, the land is very elevated, appearing rugged and mountainous from a distance, but when more nearly approached becoming highly picturesque; its hills being clothed with thick woods, and its valleys with a never-fading verdure. This part of the coast, the most rocky portion of which is between Santos and Cape Frio, may be seen from sea from a distance of 55 miles. From lat. 21° 45′ S. or from about St. João to Bahia, lat. 13° S., 650 miles, the coast is in general low and level, with hardly any indentations. From Bahia to about lat. 4° N., which embraces the whole E. projection of Brazil, the coast (about 800 miles in extent) is of moderate height, nowhere rising above 30 feet, and is also destitute of harbours, excepting those formed by the mouths of rivers. From this point to the Amazon it is extremely low and marshy; W. and N. of that river it is sandy, and somewhat higher, though still of inconsiderable elevation. From these details it will be seen that the only portion of the coast of Brazil that can be called mountainous, or which has any pretension to picturesque appearance, is that between the island of Santa Catharina, lat. 27° 35′ S., and St. João da Praia, lat. 21° 40′ S., or about a fifth part of the whole. With the exception of the Rio Francisco and the Parana, all the large rivers of Brazil empty themselves on its N. shores, and nearly all run parallel courses from S. to N., traversing the vast plains which occupy the centre and N.W. portions of the empire, and presenting means of internal communication unequalled in any other part of the globe. The surface of Brazil generally is divided into upland and lowland, in pretty equal portions; the former, which comprises the hilly districts and table-lands, extends over the E., S., and central parts, and has an average elevation of about 2000 to 2500 feet, although at some points it reaches from 4000 to 6000 feet, such elevations generally forming the culminating points of continuous mountain chains, which stretch for the most part from N. to S., as in the Serra do Mar and in the Serra dos Orgãos, though occasionally, as in the case of Itambe, the loftiest summit forms only an isolated peak; the lowland comprises the silvas or woody regions, and llanos or plains and flats; the former lying principally along both sides of the Amazon, and the latter stretching chiefly along the N. and N.E. shores.

Brazil is divided, politically, into twenty provinces, of which there are at least ten, each exceeding Great Britain in superficial extent. It is, however, very difficult to ascertain accurately the area of the provinces, and of the whole empire, the existing data being very unsatisfactory and conflicting. In the following table the area of the provinces has been calculated from the measurements given by Almeida in his Atlas of Brazil; the pop. is that given by Mr. Pakenham, secretary to the British embassy at Rio de Janeiro, in a report published in 1868:—

Provinces.	Area in sq. miles.	Population.	
		Free.	Slaves.
Amazonas	817,700	69,000	1,000
Pará	493,400	290,000	30,000
Maranhão	197,350	320,000	65,000
Piauhy	129,500	210,000	22,000
Ceará	44,740	525,000	25,000
Rio Grande do Norte	24,700	210,000	20,000
Parahiba	43,200	25,000	30,000
Pernambuco	65,200	1,000,000	250,000
Alagôas	29,060	250,000	50,000
Sergipe	16,800	220,000	55,000
Bahia	178,850	1,100,000	300,000
Espirito-Santo	19,240	50,000	15,000
Rio de Janeiro	30,400	1,070,000	300,000
S. Paulo	127,000	750,000	85,000
Paraná	80,200	80,000	10,000
Sta. Catharina	54,000	125,000	15,000
S. Pedro do Sul	101,200	340,000	80,000
Minas Geraes	246,700	1,150,000	300,000
Goyaz	320,700	135,000	16,000
Matto Grosso	618,830	40,000	6,000
	3,638,770	8,184,000	1,674,000

Total pop. 9,858,000, besides 200,000 wandering Indians. By the census of 1872, the details of which have not yet appeared, the whole pop. of Brazil was found to be 10,095,978. The number of slaves was 1,693,964, and the aborigines amounted to about 250,000.

Mountains, Table-lands, and Plains.—In remarkable contrast to the countries on the W. side of the South American continent, Brazil has no mountains of very great elevation, with exception, perhaps, of Itambe, an isolated peak in the province of Minas Geraes, which is variously stated at 5960 and 8426 feet above the sea. The higher mountains of Brazil, most of them occurring at greater and lesser distances from the E. coast, extend generally, like the Andes, from S. to N., although numerous inferior ranges traverse the country in various other directions. The most connected chains, and those in which the highest summits occur, are the Serra do Espinhaço, the Serra dos Orgãos, and the Serra do Mar. The first originates in Bahia, about lat. 15° S., and, intersecting the province of Minas Geraes, terminates at lat. 23° S. It lies parallel to the coast, and at a distance from it of about 250 miles; its culminating points are Piedade, 5830 feet high, and Itacolumi, 5750 feet. The Serra dos Orgãos (Organ Mountains), so called from the fancied resemblance of its peaks to the tubes of an organ, and the Serra do Mar, which form, in fact, but one chain, the first name being applied to the N.E. half of the range, and the second to the S.W., lie also parallel to the coast, N.N.E. and S.S.W., but at a distance from it of a very few miles only, extending from about lat. 22° to 27° S. The culminating point of this range, Morro dos Canudos, which occurs in the Serra dos Orgãos division, has an elevation of 4476 feet. Hilly regions also extend N. and W. from these mountain-systems, through the provinces of Minas Geraes, Pernambuco, Goyaz, and Matto Grosso, but none of the peaks appear to attain any very great elevation. Towards the Rio Paraguay the hills become lower, and terminate on the Bolivian frontier in elevated marshes. In this locality occurs the water-shed between the affluents of the Amazon and La Plata. It is of very inconsiderable elevation; and some of the sources of the Madeira, which falls into the former, and of the Paraguay, the head-stream of the latter are not more than 3 miles apart, and might easily be joined by means of a canal. The hilly region or table-land extends along the E. side of the empire as far N. as lat. 3° S., but inland, in Matto Grosso, not farther than 12° S., and N. of lat. 10° S., the Serra Ibiapaba may be taken as the W. limit. This table-land occupies half the empire, together with part of the Argentine Republic and Uruguay, and its average elevation is from 2000 to 2500 feet. Along the Amazon and its affluents the vast plains or silvas are said to occupy a space equal to six times the size of France. Another great plain stretches between the Serra Ibiapaba and the river Tocantins, measuring from N. to S. upwards of 600 miles, and from E. to W. more than 400.

Rivers and Lakes.—The river system of Brazil is unequalled, perhaps, in any other part of the world for the number and magnitude of the streams of which it is composed, the surface of the whole N.W. portion being interlaced with rivers of every length and volume; presenting the complex appearance of veins in the human body, to which the Amazon and its larger tributaries may be said to stand in the relation of main arteries. By far the greater portion of these numberless streams have a N. direction, and finally find their way, either directly or through their principals, to the N. shores of the empire. The largest river of Brazil, and the largest, it is believed, in the world, though not the longest, is the Amazon, which enters the empire from the W., about lat. 4° 30′ S.; lon. 70° W., and after a N.E. course from the point named of about 800 miles, falls into the Atlantic near the equator. The next in size is the Rio Francisco, which, after flowing N. for about 800 miles, suddenly turns due E., and subsequently S.E., falling into the sea about lat. 11° S. In order of magnitude follow the Rio Negro and Madeira, both tributaries of the Amazon; the former flowing from the N.W., the latter from the S.W. The other large rivers in this portion of the empire are the Branco, a tributary of the Rio Negro; the Tapajos and Xingu, other two large tributaries of the Amazon; the Araguay, Tocantins, Maranhão, and Paranahyba. Passing along the coast, S. from the embouchure of the Francisco, the following considerable rivers occur—the Vazabarris, Itapicuru, Paraguassu, Belmonte or Jequitinhonha, province of Bahia; Doce, province of Espirito-Santo; and the Paraiba-do-Sul, the S. boundary of the same province. In this enumeration of the rivers having their embouchures on the E. coast of Brazil, we have omitted an immense number of smaller streams, perhaps not many below a hundred. In the interior of the S. portion of the empire occur the large rivers Uruguay, Yguazu, Paranapanema, Tieta, Para, Paraguay, and Parana, with numerous smaller streams—smaller in comparison to these, but still large rivers—winding in all directions through every province. Most of the rivers in this part of Brazil have a W. and S. direction; those having the former proceeding from the W. side of the serras by which this part of the coast is lined, and those having the latter issuing from the hilly tract which crosses the centre of the province of Matto Grosso from E. to W., and which forms the water-shed of the W. and central part of the empire, the rivers of the province of Para flowing from it N., and those of Matto Grosso S. and W. Of the rivers last named, the Paraguay and Parana are the largest, and have the longest courses. The former has its sources in the central high lands of Matto Grosso, whence it flows nearly due S., quitting the Brazilian territory at lat. 21° S., and from this point forming the W. boundary of the independent state of Paraguay. The latter rises in the hilly district of the province of Goyaz, not far from the sources of the Tocantins, although their subsequent courses are nearly in direct opposition; the latter proceeding due N., while the former flows S.S.W. The Parana forms, throughout a portion of its course, the boundary between the Brazilian territory and Paraguay, quitting the former about lat. 25° 40′ S. Although unrivalled in the number and magnitude of its rivers, Brazil has comparatively few lakes of any great extent. The largest is the Lagoa dos Platos, in the province of Rio Grande de São Pedro, the most southern of the Brazilian provinces; it is 150 miles in length, and 35 miles in breadth at the widest part, and is separated from the sea by a narrow strip of land only; it discharges its water into the ocean by a channel called the Rio Grande. Further N. several smaller lakes occur, the largest of which may be from 20 to 30 miles in length. There are hardly any others worth mentioning throughout the whole of Brazil.

Geology and Mineralogy.—Granite prevails to the extent of 2000 miles along the coast of Brazil, and, with syenite, forms the base of the table-land. The superstructure of the latter consists of metamorphic and old igneous rocks, sandstone, clay-slate, limestone, in which are large caverns, with bones of extinct animals and alluvial soil, of which the N. part of the empire is almost wholly composed, being intersected by numerous large streams. The mineral wealth of Brazil is considerable, and includes gold, silver, and iron, diamonds, topazes, and other pre-

cious stones. Amongst the earliest discovered and first wrought gold-mines were those of Jaraguá, but they have long ceased to be regularly worked, the precious metal being found more easily and in greater abundance mingled with the sands and alluvial deposits of rivers. The process of separation, the gold being in small particles, is effected by repeated washings, which are continued until nothing but the pure metal remains at the bottom of the vessel. The entire quantity of gold produced has now greatly fallen off, being hardly a fourth of what it formerly was, owing chiefly to the auriferous sand having been exhausted. No country is so rich in diamonds as Brazil. The most celebrated mines are those of Serra do Frio, a district surrounded by almost inaccessible rocks, and guarded with the utmost vigilance. The diamonds have been hitherto found in the beds of rivers only, and are washed from the sand and flints with which they are mingled much in the same way as the gold. The largest known diamond was found in the Rio Abaeté in 1791, and weighs 138½ carats. Another, worth £45,000, was found, according to the Brazil journals, in 1847, by a negro. The negro who finds a diamond weighing 17 carats obtains his liberty, a variety of proportionate rewards being appointed for those of lesser value. About 20,000 negroes are employed in the diamond mines. The government receives one-fifth of the total value of all the gold and diamonds found in the country. Notwithstanding the sounding names of these two items of the mineral wealth of Brazil, neither of them have been nearly so profitable, nor so beneficial to the general interests of the country as the homeliest of its agricultural productions. In the short space of a year and a half the exports of sugar and coffee amounted to more than the value of diamonds found throughout a period of eighty years.

Climate.—As almost the whole of Brazil lies S. of the Equator, and in a hemisphere where there is a greater proportion of sea than land, its climate is generally more cool and moist than that of countries in corresponding latitudes in the northern hemisphere. This is particularly applicable to the flat portions of the empire, where impenetrable forests occupy the alluvial plains, and, by preventing the sun's rays reaching the earth, cut off one of the principal sources of heat—radiation. In the S. parts of Brazil, in consequence of the gradual narrowing of the continent, the climate is of an insular character—cool summers and mild winters. The quantity of rain that falls in Brazil differs widely in amount in different localities. The N. provinces generally are subject to heavy rains and violent storms; but the S. regions rejoice in a settled, mild, and salubrious climate. The rainy season commences in October, and usually lasts till March, setting in with heavy thunder-storms. At Rio, where the climate has been much modified by the clearing away of the forests in the neighbourhood, the mean temperature of the year is 72°; and the rains have been so diminished as to have seriously reduced the supply of water to the city. Generally the climate of Brazil is delightful, diffusing and maintaining a perpetual summer throughout this favoured land. In the N. parts the air in the lower tracts is somewhat sultry and oppressive; but vegetation is vigorous and profuse, the ground being covered with flowers, and the trees with a foliage that is ever green; while the nights are deliciously cool. Near the coast the temperature is modified by the trade-wind, which, after traversing the Atlantic, fans the shores of Brazil, imparting a refreshing coolness to the atmosphere.

Soil, Vegetable Productions, &c.—The soil of Brazil, so far as its capabilities have been tested, is highly fertile; although but a comparatively small portion has yet been subjected to this test, not more than a hundred and fiftieth part of the whole surface being under cultivation, and this portion is entirely limited to the coast, and to the N.E. part of the empire, which seems peculiarly well adapted for the cultivation of maize, sugar, and coffee. The pastures, however, are of vast extent; and, being covered with prodigious herds of horned cattle, form one of the principal sources of the wealth of the country. Being almost wholly within the limit of the palm region, the vegetation of Brazil is characterized generally by the peculiar physiognomy which that beautiful family of vegetables impresses on tropical countries. Of these no fewer than 100 species are native to the country. The chief food-supplying plants are sugar, coffee, cocoa, rice, tobacco, maize, wheat, manioc, beans, bananas, ipecacuanha, ginger, yams, lemons, oranges, figs, &c.—the two first, sugar and coffee, being the staple products of the empire. The manioc is a native of Brazil, and its farina is almost the only kind of meal used in that country. An acre of manioc is said to yield as much nutriment as six acres of wheat. The Indians find in this beautiful and useful plant a compensation for the rice and other cerealia of the Old World. But it is in the boundless forests of Brazil that the vigour of the vegetative power is exhibited in its most imposing form. No language, it has been said, can describe the glory of the Brazilian forests—the endless variety of form, the contrast of colour and size, the largest trees bearing brilliant blossoms of every hue, and clothed with a drapery of curious epiphytes and festoons of climbing plants, while thousands of a diameter of not less than 8 and 12 feet stand so close together that it is impossible (the intervals being filled up with an undergrowth of plants) to clear a passage between them. In contrast to these giants of the forest stand the graceful palm, the delicate acacia and bamboos, and grasses of 40 feet high. 'If the name of primeval forest,' says Humboldt, 'can be given to any forest on the face of the earth, none can claim it perhaps so strictly as those that fill the connected basins of the Orinoco and the Amazon.' But it is not in the plains alone that this gigantic vegetation is met with; the sides of the mountains are also clothed with trees of enormous size, including the most beautiful specimens of the palm and tree-fern. The cocoa-nut palm attains a great size on the sea-shores; and the curious Bertholletia, or monkey-pot tree, the kernels of which are exported from Para under the name of Brazil nuts, is met with in many localities, but more especially in the N.W. parts of the empire. A peculiar characteristic in Brazilian vegetation is the host of species of myrtle-trees, which, though not of much use economically, perfume the air with their exhalations. Among the more valuable trees of the Brazilian forests are the andaaçu, or Purga da Paulistas (*Anda Gomezii*), the seeds of which yield a tasteless oil, more powerfully cathartic than castor-oil, and now imported into Europe; the cacao or chocolate-tree; the *Cæsalpinia echinata* or Brazil-wood tree, used, under the name of Pernambuco wood, for dyeing silk of a crimson colour; the rosewood-tree, the fustic, mahogany, and a variety of others well adapted for the purposes of ship-building. The different kinds of forests and woods in Brazil are distinguished by the inhabitants by particular names. There are the Matos Virgens, or virgin forests, such as those which exist on the Organ Mountains and along the whole maritime cordillera; the Catingas, consisting generally of small and deciduous trees; the Carrascos, close-growing shrubs, about 3 or 4 feet high; and the Capveira, such wooded tracts as are formed by the small trees and shrubs which spring up where virgin forests have been cleared away. The beauty, variety,

and abundance of the flowers of this extraordinary country are no less remarkable than any other of its vegetable productions. 'The whole country,' says Mr. Gardner, 'through which we had passed for nearly two days was one vast flower-garden, where, "like a child at a feast," I knew not which object to grasp at first; everything was not only new to me, but each more beautiful or more curious than the other.'

Animals.—The principal domestic animals of Brazil are horned cattle and horses; the numbers of the former are prodigious, covering the boundless plains of the interior. The greatest part of them live in a wild state, and are not milked. Horses are numerous in the S. provinces; they are of a middling size, from 12 to 14½ hands high, but strong, lively, and swift. Mules are reared in the S. provinces. Sheep are in little repute, the meat being ill flavoured and the wool of indifferent quality. Goats and hogs are abundant. The woods of Brazil swarm with rapacious animals—tiger cats, hyenas, saratus (a ferocious creature about the size of a fox), jaguars, sloths, porcupines, &c. Wild hogs are also common, as well as an amphibious animal called the water-hog or capybara, resembling a hog in form, but of the size of a heifer. Monkeys are likewise numerous; and vampyre bats are in some localities so destructive as to prevent the rearing of cattle. Amongst the feathered tribes are, the smallest, the humming-bird, and one of the largest, the emu and vulture. Water-fowl, especially geese and ducks, abound in certain seasons on the lakes and lagoons at the S. extremity of Brazil. The reptiles consist of the boa-constrictor, the corral snake, the sorrocuco, and the jarraraca (*Bothrops Neuwiedii*, Spix), all venomous, and much dreaded by the natives, especially the last, which, when full grown, is usually about 6 feet long, and is nearly allied to the rattlesnake genus. It prevails over all the S. provinces. Its bite is attended with great suffering, and with the most serious consequences, even where death is averted. In the marshy countries of the S. the boa or python is said to attain a length of 48 feet; but, according to Humboldt, the largest skins which have as yet been brought to Europe and carefully measured do not exceed 21 to 23 feet. The insects of Brazil are, many of them, remarkable for the beauty of their colours and their size, especially the butterflies. Other descriptions are so numerous in the woods that their noise is heard in a ship at anchor some distance from the shore; while the white ants are so numerous and destructive that Humboldt says there is not a manuscript in South America 100 years old. The scorpions of Brazil attain a length of 6 inches. Most of the bees of that country are stingless, there being no fewer than thirty species of that description. The shores and rivers abound with fish. Amongst the most valuable of those caught on the former is the garopa, which attains a length of from 12 to 20 feet, and is well tasted; they are most numerous on the coast of Bahia, where great quantities are annually taken and exported. The numbers of fish caught in the Amazon and other rivers of the empire are very great, constituting a principal part of the subsistence of the inhabitants.

Literature, Education, &c.—In every town schools for teaching the first rudiments are now to be found, to which all citizens are admitted free. There are no universities, but there are law colleges at Pernambuco and São Paulo, and medical colleges at Rio de Janeiro and Bahia. In all large towns there are professorships of Latin, Greek, English, French, philosophy, rhetoric, geometry, chemistry, botany, &c.; and printing-presses are now common throughout Brazil.

People.—The free population of Brazil consists of Europeans, white persons born in Brazil, or native Brazilians; mulattoes; Mamalucoes, a mixed caste between whites and Indians; Indians in a domesticated state, called Caboclos; Indians in a savage state called Tapuyas; free negroes, born in Brazil; manumitted Africans; Mestizoes, a mixed caste, between Indians and negroes. The slave population consists of Africans, creole negroes, mulattoes, and Mestizoes. The native Brazilians are an idle and inactive race, with few wants, and fewer enjoyments. The mulattoes, the offspring of Europeans and negroes, are ingenious, and evince an aptitude for the mechanical arts. The Tapuyas, or native Indians of Brazil, are of a copper colour, robust, and well made, but of short stature. They generally go naked, paint their skins, and are fond of ornamenting their heads with feathers. To this race belong the Botocudes or Botucudos, a ferocious tribe, who inhabit the banks of the Rio Doce and the Belmonte. See BOTOCUDOS.

Commerce.—The principal articles of import are, cottons, linens, woollens, wrought and unwrought iron, hardware and cutlery from Britain; cottons, trinkets, furniture, wax, candles, hats, dry fruits, and wine from France; glass, beer, linen, paper, &c., from Germany; iron, copper utensils, sailcloth, cords, ropes, &c., from Russia and Sweden; wine, brandy, fruits, &c., from Portugal; and wheat, flour, biscuits, soap, leather, &c., from America. The exports consist of coffee, sugar, cotton, hides, cabinet and dye woods, drugs, gums, and diamonds. The value of the imports into Brazil in 1843 was £5,880,239; of the exports from Brazil the same year £4,749,443. In the three years, 1870–72, the total annual value of the imports, including bullion and specie, averaged £19,000,000; while the annual value of the exports during the same period averaged £22,500,000.

The imports from Great Britain amounted in 1871 to £6,536,945, and the exports to the same quarter to £6,693,426. The chief exports to Great Britain are raw cotton (value in 1871, £2,980,644), unrefined sugar (value, £1,416,020), caoutchouc (value, £992,955), coffee (value, £564,611), and hides (value, £392,206). The number and tonnage of vessels that entered and cleared from the principal ports of Brazil in 1869–70, was, entered, 3540 vessels, tonnage 1,436,000; cleared, vessels 3215, tonnage 1,500,000. In the same year 4903 vessels engaged in the coasting trade entered, and 4994 cleared. There are six railways, with a total length of 410 miles in operation; and there are also about 1200 miles of telegraphs.

Religion, Government, &c.—The established religion of Brazil is Roman Catholic, although other religions are tolerated. The government of the empire is monarchical, hereditary, constitutional, and representative. The legislative power is in the General Assembly, which consists of two chambers—the senate, and chamber of deputies; the former elected for life, and the latter for four years. In 1871 the public debt stood as follows:—

Foreign	£15,780,725
Internal funded	27,027,765
Other internal liabilities	25,590,395
Total debt	£68,398,885

A great increase in the debt was caused by the Six Years' war with Paraguay. In 1869–70 the revenue was £18,048,871, and the expenditure £17,644,201. By a vote of the House of Congress in June, 1869, the force of the standing army was fixed at 20,000 men on the peace footing, and 60,000 on the war footing. Besides these, there is a national guard, the strength of which was stated officially to be 611,241 in June, 1872. The navy consisted of eighty-seven men-of-war, eighteen of which were ironclads.

History.—Brazil was discovered January 26, 1500, by Vincente Yanez Pinçon, one of the companions of Columbus, and was subsequently taken possession of by Pedro Alvares de Cabral. Emanuel, king of Portugal, had equipped a squadron for a voyage to the East Indies, under the command of Cabral. The admiral, quitting Lisbon March 9, 1500, fell in accidentally, April 24th, with the continent of South America, which he at first supposed to be a large island on the coast of Africa. In this conjecture he was soon undeceived, when the natives came in sight. Having discovered a good harbour, he anchored his vessels, and called the bay *Puerto Seguro*. On the next day he landed with a body of troops, and having erected the cross, took possession of the country in the name of his sovereign, and called it *Santa Cruz;* but the name was afterwards altered by King Emanuel to that of *Brazil*, from the red wood which the country produces.

The Portuguese entertained, for some time, no very favourable opinion of the country, not having been able to find there either gold or silver; and, accordingly, they sent thither none but convicts and women of abandoned character. Two ships were annually sent from Portugal, to carry to the new world the refuse of the human race, and to receive from thence cargoes of parrots and dye-woods. Ginger was afterwards added, but in a short time prohibited, lest the cultivation of it might interfere with the sale of the same article from India. In 1548 the Jews of Portugal, being banished to Brazil, procured sugar-canes from Madeira, and began the cultivation of that article. The court of Lisbon began to perceive that a colony might be beneficial without producing gold or silver, and sent over a governor to regulate and superintend it. This was Thomas de Souza, a wise and able man. De Souza found it very difficult to succeed in inducing the natives to fix on settled habitations, and to submit to the Portuguese government. Dissatisfaction ensued, which at length terminated in war. De Souza did not bring with him a sufficient number of men to conclude hostilities speedily. By building St. Salvador, in 1549, at the bay of All Saints, he established a central and rallying point for the colony; but the great object of reducing the Indians to submission was effected by the Jesuits, who gained their affections by presents and acts of kindness.

The increasing prosperity of Brazil, which became visible to Europe at the beginning of the seventeenth century, excited the envy of the French, Spaniards, and Dutch successively. The latter, however, were the principal enemies with whom the Portuguese, had to contend for the dominion of Brazil. Their admiral, Willekens, in 1624, took possession of the country in the name of the United Provinces. Having plundered the people of St. Salvador, he returned to Europe, leaving a strong garrison. The Spaniards next sent out a formidable fleet, laid siege to St. Salvador, and compelled the Dutch to surrender. When the affairs of the Dutch assumed a more favourable aspect at home, they despatched Admiral Henry Lonk, in the beginning of 1630, to attempt the entire conquest of Brazil. He succeeded in reducing Pernambuco, and on his return to Europe left behind him troops which reduced, in 1633, 1634, and 1635, the provinces of Temeraca, Paraiba, and Rio Grande. These, as well as Pernambuco, furnished yearly a large quantity of sugar, a great deal of wood for dyeing, and other commodities. The Dutch now determined to conquer all Brazil, and intrusted Maurice of Nassau with the direction of the enterprise. This distinguished officer reached the place of his destination in the beginning of 1637, and subjected Ceará, Sergipe, and the greater part of Bahia. Seven of the fifteen provinces which composed the colony had already submitted to them, when they were suddenly checked by the revolution which removed Philip IV. from the throne of Portugal, and gave to the Portuguese independence and a native sovereign. The Dutch, as enemies of the Spaniards, became friends to the Portuguese, and the latter confirmed the title of the Dutch to the seven provinces of which they were in possession. This division gave rise to the name of the *Brazils*, in place of the former appellation. The Dutch government soon began to oppress the Portuguese colonists, who, after an obstinate contest, drove them out of several of the provinces. Finding they were not able to retain possession of the country, the Dutch ceded all their interest to the Portuguese for a pecuniary compensation. The dominion of Portugal was now extended over all Brazil, which, during the eighteenth century, remained in the peaceful possession of the Portuguese.

The value of Brazil to Portugal continued steadily to increase after the discovery of the gold mines, in 1698, and the discovery of the diamond mines in 1728. Up to the year 1810 Brazil had sent to Portugal 14,280 cwts. of gold and 2100 lbs. of diamonds, which foreign countries, and especially Great Britain, at last succeeded in purchasing at the Lisbon market. Rio Janeiro now became the mart for the proceeds of the Brazilian mines and native productions. But the administration was anything but adapted to promote the prosperity of the country. The attention of the government was turned almost exclusively to the gold washings and to the working of the diamond mines; and the policy of the administration consisted in the exaction of taxes and duties, which were collected from the fortified ports, to which trade was solely confined. Foreigners were excluded or jealously watched, and trade was paralyzed by numerous restrictions. In the interior, the lands situated on the great rivers, after being surveyed, were frequently presented after the year 1640, by the kings of the house of Braganza, to the younger sons of the Portuguese nobility, whom the system of entails excluded from the prospect of inheritance. These grantees enlisted adventurers, purchased negro slaves by thousands, and subjected the original inhabitants or drove them from their districts, and ruled their dominions with almost unlimited sway. The missions of the Jesuits also received similar donations from the kings. They organized a brave militia from the converted savages and their descendants, and bore the sword and the cross farther and farther into the interior. Equally independent with the secular lords of the soil, they united the converted savages in villages and parishes along the rivers. The celebrated Jesuit Vieyra introduced the cultivation of spices, in which Holland alone had hitherto traded. As these Brazilian proprietors defrayed from their own means the above-mentioned indemnifications made to the Dutch, the Portuguese government, in return, confirmed and enlarged all the privileges of the ancient planters, extending them to the present and future possessions of these noble families. But in the end the government multiplied its own monopolies, and assumed prerogatives interfering with the interests of the ancient and rich landlords. Even from 1808 to 1821, as long as the court resided in Rio Janeiro, the Portuguese by birth continued to have the preference in the high offices of state before the chief native families; and the system of taxing the productions of Brazil, and the importation of articles needed by the Brazilian nobility for themselves and slaves, was even extended. The government finally placed obstacles in the way of increasing the number of the latter, which the rich landlords deemed indispensable for the establishment of new plantations. The vassals,

moreover, always had a stumbling-block in their way in the fiscal prerogative of the court, that the land which the vassal called his own, but which he had hitherto neglected to search for gold or for diamonds, in case of any future discovery of such treasures, should be the property of the crown, or at least the object of high taxation. Even the humanity of the government, in attempting to ameliorate by laws the condition of the slaves, was a subject of offence, because it appeared to the lords to be an injury to their legal property to proceed in such a matter without their consent. Without ascribing to the Brazilians any democratic propensities, all these circumstances must have awakened the desire of independence in their breasts, as much as it augmented their hatred of the Portuguese. From these two causes a conflict of parties of several years' duration at length took place, the result of which was the present empire.

On the invasion of Portugal in 1808 by the French, the sovereign of that kingdom, John VI., sailed for Brazil, accompanied by his court and a large body of emigrants. Soon after arriving there he began to improve the condition of the country by placing the administration on a better footing, and throwing open its ports to all nations. On the fall of Bonaparte the king raised Brazil to the rank of a kingdom, and assumed the title of King of Portugal, Algarve, and Brazil. The revolution which took place in Portugal in 1820, compelling the king to return to that country, he next year sailed for Lisbon, leaving Pedro, his eldest son and successor, as lieutenant and regent. But as the Portuguese Cortes was not willing to grant the entire equality of civil and political relations demanded by the Brazilians, and had expressly declared that Brazil was to be divided into governments, and ruled by the ministry of state at Lisbon, and the prince-regent was to be recalled to Portugal—such violent convulsions were excited in Rio Janeiro and various parts of Brazil, Dec. 1821, that it was explicitly declared to the prince-regent that his departure would be the signal for establishing an independent republic. The prince, therefore, resolved to remain in Brazil, and gave a public explanation of his reasons, Jan. 9, 1822, to his father, to the Cortes in Portugal, and to the people of Brazil. The Portuguese troops were removed from Brazil. The prince-regent assumed, May 13, 1822, the title of 'perpetual defender of Brazil,' and in June convened a national assembly, composed of 100 deputies, to frame a separate constitution for the country. The National Assembly of Brazil declared the separation of that country from Portugal, August 1, 1822, and, October 12, appointed Don Pedro the constitutional Emperor of Brazil. The new emperor retained, at the same time, the title of 'perpetual defender of Brazil.'

The king, after some slight and ineffectual attempts to re-establish the former relations between Portugal and Brazil, acknowledged the independence of the latter country in 1825. Some years afterwards a series of tumultuary proceedings ended in the abdication of Don Pedro, who left Brazil on April 7, 1831, leaving his son, who was under age, as his successor. The rights of the latter were recognized and protected, and a regency of three persons appointed by the Chamber of Deputies to conduct the government during his minority. In 1840 the young emperor was declared of age, being then in his fifteenth year, and was crowned on July 18, 1841. The new government had considerable difficulty in crushing the republican and revolutionary party, which kept up a series of struggles in several provinces for some years. In 1845 the insurgents had all laid down their arms, but in 1848 a new rising took place, which was put down not without difficulty in the following year. In 1851 a war broke out with Rosas, dictator of Buenos Ayres, in which Brazil was joined by Paraguay, Uruguay, Corrientes, and Entre Rios, and which ended in favour of the allies. From this war Brazil received a certain impulse. The trade now increased, the finances of the country improved, and the government began to further the development of the country by constructing roads, encouraging immigration, and fostering the education of the people. In 1853 the Bank of Brazil was founded, and the construction of railways began. In 1859 a minister for agriculture, commerce, and public works was appointed, and a large government loan for the construction of railways was authorized. In 1863, in consequence of the arrest of three English naval officers, a misunderstanding arose with England, which led to the termination of diplomatic relations for a time between the two countries. Meanwhile (Nov. 1864) hostilities had been commenced by the Paraguayans under President Lopez against Brazil, in consequence of the interference of the latter in the affairs of Uruguay; and in May, 1865, an alliance for the purpose of carrying on war against Paraguay was concluded between Brazil, the Argentine Confederation, and Uruguay. This war, the brunt of which had to be borne by Brazil, lasted till 1870, the Paraguayans having maintained a heroic resistance, and having only given up the contest on the death of their leader, Lopez, in battle against the Brazilians (March 1, 1870). This struggle was attended with an immense expenditure of men and money to Brazil, but it established her reputation as a great power and secured the freedom of the navigation of the La Plata river-system. The event of most importance in Brazilian history since the war is the act for the gradual emancipation of the slaves. It received the imperial sanction on the 28th of Sept. 1871, and enacts that from that date all children born of slave women shall be considered of free condition. They are not, however, to be actually free, but are bound to serve as apprentices the masters of their mothers for 21 years. But in case of cruelty practised on a slave by his masters, the former may bring an action in a criminal court, which may pronounce his freedom. The same law also declares that all the slaves of the state are free, but they are to be under government inspection for five years, and are bound to hire themselves out on pain of being compelled to work in the public establishments, if they are found living in vagrancy. (Spix and Martius' Travels in Brazil; Kidder's Brazil; Gardner's Travels in Brazil; Humboldt's Aspects of Nature, &c.)

BRAZILIAN GRASS, a name popularly and incorrectly given to a substance which is obtained from the *Chamærops argentea*, and which is imported into this country for manufacturing purposes. See CHAMÆROPS.

BRAZIL NUTS. See BERTHOLLETIA.

BRAZIL WOOD, a kind of wood yielding a red dye, obtained from several trees of the genus Cæsalpinia, natives of the West Indies and Central and South America. The best kind, *Cæsalpinia echinata*, is found in the greatest abundance in the province of Pernambuco, in Brazil, where it is called *pao da rainha*, or queen's wood. The tree is large, crooked, and knotty; the leaves are of a beautiful red, and exhale an agreeable odour. Other kinds are *C. Brasiliensis*, *C. crista*, and *C. Sappan*, or the sappan wood of the East Indies. The bark is so thick that a tree as large as a man's body with the bark, will not be so thick as the leg when peeled. It is pale in colour when first cut, but becomes darker when exposed. The wood is hard and heavy, and as it takes on a fine polish, it is used by cabinet-makers for various purposes, but its principal use is in dyeing red.

The dye is obtained by reducing the wood to powder and boiling it in water, when the water receives the red colouring principle, which is a crystallizable substance called *brazilin*. The colour is not permanent unless fixed by suitable mordants. Brazil wood has been for many years past a royal monopoly; its exportation, except on account of government, being prohibited. The quantity of Brazil wood imported into this country is but inconsiderable. It has been shown that the term Brazil wood was applied to an East Indian dyewood long before the discovery of Brazil, which therefore, no doubt, derived its name from producing such trees in abundance.

BRAZING, or BRASS-SOLDERING, the process of uniting two pieces of brass, two pieces of copper, or one of each by means of a hard solder, that is, a solder which fuses at a comparatively high temperature. The solder is applied in the form of a coarse powder, and is always mixed with borax, which prevents the oxidation of the metals which are being soldered together. It is usual to moisten this mixture with water before spreading it over the surfaces to be joined. When the solder has been applied in this state, the pieces of metal are slowly heated, by which the water is made to evaporate, leaving a crust of the solder on the parts where it is required. The pieces are then exposed to a stronger heat, until the borax melts and fluxes the solder, which suddenly flushes the joints of the pieces of metal, and thus unites the two surfaces, making them into one piece. The whole is now allowed to cool, and is afterwards dressed with a file. Pieces of metal which have been united in this way are held together as firmly as if they were only one piece. For the proportions used in the best solders for brazing, see SOLDERS.

BRAZOS-DE-DIOS, a large river, United States, Texas, rising among the mountains in the N.W. part of the state, under the parallel of 33° N.; flowing S.E. between the Colorado and Trinidad, and after a course of about 900 miles, falling into the Gulf of Mexico, between Quintana and Velasco, 58 miles W.S.W. Galveston; lat. 28° 48′ N.; lon. 95° 40′ W. It is navigable during freshets for a considerable distance; but there are only 6 feet water on the bar at its mouth. Its principal affluents are the Red Fork and Navosota. Among the towns on its banks are Milam, Nashville, Washington, and Richmond. The cotton plantations along its banks are highly productive.

BRAZZA (ancient *Brachia*), an island, Austria, in the Adriatic Sea, and belonging to Dalmatia; lat. 43° 16′ N.; lon. 16° 37′ E. It is 24 miles long, and from 5 to 7 broad; contains twenty villages, and is separated from the mainland by a channel 12 miles broad, which affords excellent anchorage for shipping. The island is very mountainous and well wooded; and in the valleys vines are grown, from which are made the best wines in Dalmatia. It produces also good oil, almonds, and saffron, and grain in small quantity. Much attention is paid to the cultivation of bees and silkworms. The chief town, St. Pietro di Brazza, has a small port, defended by a mole. At Milna there is a considerable ship-building yard. Pop. 14,090.

BREACH, the aperture or passage made in the wall of any fortified place, by the ordnance of the besiegers, for the purpose of entering the fortress. They should be made where there is the least defence, that is, in the front or face of the bastions. In order to divide the resistance of the besieged, breaches are commonly made at once in the faces of the attacked bastions, and in the ravelin. This is effected by battering, and at such places as the cannon do not reach, by the aid of mines. The breach is called *practicable*, if it is large enough to afford some hope of success in case of an assault. This is generally considered to be the case if it allows a passage to fourteen men abreast. Frequently, however, a breach of much less extent, even of half that width, may be entered.

BREACH, in law, any violation of a law, whether the performance of an action prohibited by law, or the non-performance of a duty imposed by law.

BREACH OF ARRESTMENT, in Scots law, an act of contempt of legal authority, committed by an arrestee disregarding the arrestment used in his hands, and paying the sum or delivering the goods arrested to the common debtor. Formerly the person guilty of breach of arrestment might be prosecuted both in a civil and criminal court, but there are no instances of such prosecutions in more recent times, and all that the person guilty of it now exposes himself to is an action for damages to the extent of the funds paid away and the expenses.

BREACH OF CLOSE, in English law, any entry upon another man's property which is not warranted by being made in the exercise of a right. Thus the entry upon another's property is not a breach of close, when it is made in exercise of a right of way or a right of common, or when one enters in order to demand payment of money from the proprietor which is payable on the land, or when he enters to pay money in the same circumstances. It is also justifiable for a landlord to enter upon another's property to distrain for rent, for one who has a reversionary interest in an estate to enter to see that no injury is done to it, and, of course, for anyone to enter an inn or public-house without the express permission of the proprietor, for that permission is implied in the fact of his keeping such a house. It is not necessary to constitute breach of close that the property unwarrantably entered should have an actual fence inclosing it, for every man's land is regarded as inclosed in the eye of the law, even though any actual inclosure be wanting. One who is guilty of breach of close is liable to an action for damages at the hands of the injured party, and the liability extends even to a trespass committed by his cattle.

BREACH OF COVENANT, the act of violating an agreement in a deed either to do or not to do something. One who commits a breach of this nature is liable to a civil action.

BREACH OF CONTRACT. See CONTRACT.

BREACH OF DUTY, the non-performance of a duty, or the performance of it in such a manner that injury is done to one's employer, through want of integrity or due diligence and skill. It is assumed that there is an implied contract between an employer and the person that he employs, according to which the latter agrees to perform the duties intrusted to him in such a manner that the interests of his employer shall not suffer. In case of breach of duty what is called an action of *assumpsit*, that is, an action for the recovery of damages for the non-performance of a promise, which, though not under seal, is yet founded on proper consideration, may be brought by the one who has sustained an injury, against the person by whom the breach has been committed.

BREACH OF PEACE, the taking part in any riot, affray, or tumult, which is destructive to the public tranquillity, or the causing others to do anything to injure the public tranquillity. The former are actual, the latter constructive breaches. In both cases the breach of the peace may be either felonious or not felonious. The felonious breaches of the peace are three in number: (1) The riotous assembling of twelve or more persons, and not dispersing upon proclamation; (2) The riotous demolishing of churches,

houses, buildings, or machinery; (3) Maliciously sending, delivering, or uttering, or directly or indirectly causing to be received, knowing the contents thereof, any letter or writing threatening to kill or murder any person. The remaining offences are not felonious, and include—(1) affrays; (2) riots, routs, and unlawful assemblies, which must have at least three persons to constitute them; (3) tumultuously petitioning; (4) forcible entry or detainer, which is committed by violently taking or keeping possession of lands or tenements with menaces, force, and arms, and without the authority of the law; (5) riding, or going armed, with dangerous or unusual weapons, terrifying the good people of the land; (6) spreading false news; (7) false and pretended prophecies, with intent to disturb the peace. Finally, there are two constructive breaches of the peace, namely, challenging another to fight, or bearing such a challenge, and the making public by either printing, writing, signs, or pictures, malicious defamations of any person, especially a magistrate, in order to provoke him to wrath, or expose him to public hatred, contempt, and ridicule.

BREACH OF POUND, the act of destroying or breaking into any pound for the purpose of rescuing cattle that have been distrained for rent, and deposited in the pound. It is an indictable offence, the cattle being deemed to be in the possession of the law.

BREACH OF TRUST, is a violation of duty by a trustee, executor, or any other person in a fiduciary position. A trustee is not permitted to manage an estate intrusted to him in such a manner as to derive any advantage to himself, and at the same time he is bound to manage it in such a manner that the person for whom he has it in trust shall reap from it the greatest possible advantage. Accordingly money held in trust by a trustee must be invested by him in government stock for the behoof of him for whom he has the money in trust; and if he has not done so he is, as a general rule, bound to pay interest on the money. In Scotland it is not considered the duty of the trustee to invest money in government securities alone, for in that country investments in heritable securities or mortgages are quite as safe as investments in government stock, and they are even to be preferred to the latter. A trustee who has grossly mismanaged his trust is required to pay five per cent. interest and sometimes compound interest. The Court of Chancery has adopted two rules to guide the decisions with respect to the liability consequent upon a breach of trust. The purport of the first is that with a view not to strike terror into persons acting for the benefit of others the court will deal leniently with trustees who have endeavoured fairly to discharge their duty, and in case of any misapplication of the trust money the court will not hold the trustees liable on slight grounds. The second rule is that care must be had to guard against any abuse of their trust on the part of the trustees. By 20 and 21 Vict. cap. liv., breach of trust was made punishable as a misdemeanour with fine and imprisonment. According to the law of Scotland, the punishment may vary from imprisonment for a few months to penal servitude. (See LARCENY.) On all these applications of the term breach in law, consult Wharton's Law Lexicon, and Bell's Dictionary of the Law of Scotland.

BREAD. In the earliest antiquity we find the flour or meal of grain used as food. The inconvenience attending the use of the grain in its natural state, and perhaps the accidental observation that when bruised and softened in water it formed a paste, and when dried again a more compact, mealy substance, led by degrees to the artificial preparation of bread. Easy as it seems to us, it must have been a long time before it was completely successful. The grain was first bruised between stones, and from the meal mixed with milk and water a dry, tough, and indigestible paste was made into balls. This is yet the chief food of the caravans in the deserts of Northern Africa. After many attempts, or perhaps accidentally, it was observed that by bringing the paste into a state of fermentation its tenacity is almost entirely destroyed, and the mass becomes bread; porous, agreeable to the taste, digestible, and consequently healthy.

Bread, as is well known, is made from the flour or meal of the cereals, maize and rice being principally used for the purpose in the more southern countries, rye, barley, and oats in the more northern, and wheat in the intermediate and temperate regions; but other vegetable products, such as beans, pease, lentils, turnips, carrots, potatoes, and even the bark of trees are also sometimes employed either alone or mixed with the flour of the cereals. Beet and flour, in the proportion of equal weights, have been found to constitute a nutritious and palatable bread, and a very nutritious bread may also be made from the flour of beans and pease. By far the greater proportion of the bread consumed in the British Islands is made from wheat flour, though in the country districts of Scotland oatmeal cakes or bannocks are still used to some extent. Their use is decreasing every year however. Rye-bread is not much used in this country, but in the northern parts of Europe it is more common than wheaten bread. It is darker in colour than the latter, and a little less nutritious. In Westphalia a kind of very coarse black bread, called *Pumpernickel* (which see), is made from rye, of which the peasants bake one large loaf for the whole week. In many parts of Germany bread is made of grain nearly entire, or but just bruised. In some parts of Scandinavia bread is composed in part of the bark of trees during the winter.

Bread is either fermented or unfermented. In making the former, leaven or yeast is used, which causes it to *rise*, and gives it the well-known spongy texture of the common loaf; the latter is made without yeast, and is more dense and solid than the former, except where the effect of fermentation is produced by chemical means, as in aerated bread. (See below.) A great proportion of the biscuits manufactured, those known as ship-biscuits in particular, are unfermented. In a good many parts of England, especially in the country districts, people are in the habit of making their own bread, and those accustomed to the home-made bread generally prefer it to that of the bakers. It is sweeter, more compact and full-flavoured, and keeps much longer. The process of bread-making, that is, of making the common fermented loaf, as it is practised in bakeries in this country, is generally as follows:—The first thing to be done towards the manufacture of a batch of bread is, in the language of the baker, *to stir a ferment*. For this purpose, water, yeast, flour, and some potatoes mashed and strained through a cullender, are mixed together and worked up into a thin paste, in which, on being left at rest for a time, an active fermentation sets in, the carbonic acid generated causing the mixture to rise and fall. In about three hours the fermenting action is at rest, and the mixture may now be used, but it is not generally used till at the end of four or five hours. The next operation is called *setting the sponge*. This consists in stirring up the above ferment well, adding some lukewarm water, and mixing in as much flour as will make the whole into a pretty stiff dough, which receives the name of the *sponge*. The sponge being kept in a warm place begins to ferment in the course of an hour or so, heaving and swelling up till at last

the imprisoned carbonic acid bursts from the mass, which then sinks or collapses. 'This is called *the first sponge*. But as the fermentation is still going on, the carbonic acid soon causes the sponge to rise again as before to nearly twice its volume, when the carbonic acid bursting through the mass causes it to fall a second time; and this constitutes what the bakers call *the second sponge*. The rising and falling might then go on for twenty-four hours; but as the alcoholic would pass into the acetous fermentation soon after the second rising, the baker always interferes after the second and very frequently after the first sponge. The bread made from the first sponge is generally sweeter; but unless the best flour is used, and even then the loaf that is made from it is smaller in size and more compact than that which is made with the second sponge. In hot weather, however, as there would be much danger of the bread turning sour if the sponge were allowed to *take a second fall*, the first sponge is frequently used' (Ure's Dictionary of Arts, &c., by Hunt). The next process is called *breaking the sponge*, and consists in adding to it the requisite quantity of water and salt, the sponge being torn to pieces by the hand and thoroughly mixed with the water. The remainder of the total quantity of flour intended to be employed is now gradually added, and the whole is kneaded into a dough of the due consistency. The kneading is a most important process, as the rising or complete fermentation of the bread, and consequently its wholesomeness, largely depends upon it. It is known to have been carried far enough, when the hand, on being pushed into the mass of dough, is withdrawn without any adhering to it. The dough is now allowed to remain in the trough till it rise or *give proof*—an interval of from one and a half to three or four hours, according to the kind of yeast employed—and it is then weighed off into lumps, which are shaped into loaves and placed in the oven. There they are exposed for about an hour to a temperature of 570° Fahr., which is gradually allowed to fall to 430° or 420°, and in the process of baking they swell to about double their original size. The yield of a sack of flour is ninety to ninety-two 4-lb. loaves. Three kinds of yeast are used by bakers: brewer's yeast or barm, German yeast, and patent or hop yeast. The first is that derived from ale only, as porter yeast is too bitter; German yeast is obtained from the *unterhefe* in the brewing of Bavarian beer (see ALE AND BEER), and is now largely imported into this country; patent yeast consists of a decoction of hops, to which malt with some brewer's or German yeast is added. Several qualities of flour are used, and are known by the names of *firsts* or *whites*, *seconds* or *households*, and *thirds*. The latter two contain a certain proportion of the bran. *Brown* or *whole-flour* bread is pretty extensively eaten in this country, and is considered to be very wholesome. It is made from undressed wheat, and consequently contains the bran as well as the flour. As the bran consists to a great extent of gluten, starch, fatty, and other nutritious substances, many contend that it is an error to remove it from the flour, since thereby a large amount of nutriment is altogether lost to the public, while the fine flour that remains is both less nutritious and less digestible than if the bran were retained. That there is more nutriment in the whole meal than in the flour is certain, but it has been alleged that the former is apt to pass through the alimentary canal too quickly to allow of its nutriment being properly extracted. Still there is no doubt that for many constitutions it forms a very healthy and suitable food.

Formerly, when chemistry was less advanced than it is now, breadmaking or 'panification' was considered a great mystery, and a special kind of fermentation was ascribed to it by philosophers. Now, however, it is resolved into the simplest operations resulting from common and acknowledged causes. The cereals contain in their grains, deposited in cells, a substance called gluten, exactly the same in composition as flesh. It is present in larger quantity in the centre than at the surface of the grain. An average quality of flour consists of

Gluten	12
Starch	70
Sugar	5
Gum	3
Water,	10
	100

When water is added to the flour, in the first operation of baking, it unites with the gluten and starch, and dissolves the gum and sugar. The yeast or barm added acts now upon the dissolved sugar, especially at an elevated temperature, and produces the vinous fermentation, forming alcohol, and setting free carbonic acid as a consequence of the transformation of the elements of the sugar. The gaseous carbonic acid is prevented from escaping by the glutinous property of the nitrogenous ingredient, and if the mixing or kneading has been properly performed, it remains very equally diffused through every part of the dough. The amount of sugar thus decomposed is very small in amount, probably never exceeding 1 per cent. of the weight of the flour, or one-fifth of the sugar present in it. The alcohol and carbonic acid are carried into the oven with the dough, and the former partially escapes, while the latter gas, being expanded by the heat, endeavours to do so, but meets with obstacles, not only from the gluten, but also from the starch, which the heat causes to pass from its insoluble to its soluble state, and in doing so it becomes much inflated by the escaping gas. The regulation of the temperature is important, because if it were urged too quickly, the bubbles of gas bursting through their prison would unite together into larger bubbles, and form those large cavities which the good baker dislikes so much to see. Many attempts have been made to economize the alcohol expelled by the heat, but none have met with success, the quantity produced being so small as not to repay the expense of its collection.

When starch is roasted, it passes into a kind of gum, which is, to a small extent, formed in the crumb of the bread, but much more largely in the crust. The outer part of the loaf receiving the heat, loses much of its water; its starch passes into gum; its sugar into caramel; and this, aided by a like change in the other organic matters, produces the peculiar colour of the crust. The flour, during baking, has united with much water, the loaf generally containing 43 per cent., while flour has only 10 per cent. In workhouses and large establishments, where the bread is baked in connected loaves, and not in separate cans, the amount of water is as much as 50 per cent., or one-half of the whole weight. One hundredweight of flour baked into bread will therefore produce, on an average, about 160 lbs. of the latter. It will thus be obvious, that a pound of flour contains considerably more nutriment than the same weight of bread. The changes, however, which have taken place during the formation of the latter, render it more easily digestible, and hence, better adapted for the purposes of nutrition.

We have now to say a few words on *aerated bread*, or unfermented bread, which receives its sponginess or porosity from carbonic acid supplied artificially, and not produced by fermentation. Bread of this sort has been made in small quantities for a good

many years, but it is only in quite recent times that its use has become at all extensive. In a pamphlet entitled Instructions for making Unfermented Bread; by a Physician, published in 1846, hydrochloric acid and bicarbonate of soda were recommended as agents for producing carbonic acid in the loaf, nothing else being added to the flour except water and salt; but carbonic acid water is now generally employed for the same purpose, according to the process invented by Dr. Dauglish. Since water is capable of absorbing carbonic acid in quantities equal to its own bulk, the water to be used in kneading the dough is placed in a strong iron box, and has a large quantity of carbonic acid forced into it by means of pressure. The flour and salt are contained in another strong air-tight vessel, inside of which there is a kneading apparatus worked from without through a closely-packed stuffing-box. By means of a connecting pipe the water is introduced into the latter vessel, where it undergoes the same pressure, and the kneading apparatus is set to work. When the kneading is thoroughly performed the pressure is removed, and the escape of the gas raises the dough or sponge. The loaves are baked in separate tins, the requisite quantity for a loaf being divided off into the tins by mechanical means. An improved oven was invented by Dr. Dauglish which consists of a long chamber with an endless chain travelling along it, and forming a kind of movable bottom, in which the tins containing the loaves are placed, and are baked in their progress from one end to the other. Bread made in this way is as sweet and agreeable to the taste as any fermented bread; it is light and uniform in texture, and as it retains some of the valuable ingredients of the flour that are lost by fermentation, it is preferable on the score of its nutritive properties. For dyspeptic persons and infants it is highly recommended. Another thing in its favour is its cleanness and purity. It contains nothing but flour, water, and salt; and as it is scarcely touched by the hand in the process of making, those who use it are not disgusted to think that their bread may have been laboriously kneaded by the hands of some perspiring and not over cleanly workman; for kneading-machines, which should be used in every bakery, are by no means common yet, though several have been invented. Improved ovens have also been invented, and to some extent introduced. We may mention, in particular, the hot-water oven of Mr. Perkins.

Bread is adulterated with a good many substances, such as sulphate of copper, carbonate of magnesia, chalk, plaster, starch, potatoes, &c., but the substance most commonly used for this purpose is alum. Alum enables the baker to give to bread of inferior flavour the whiteness of the best bread, and also to keep in the loaf an undue quantity of water, which, of course, increases its weight. Boiled rice is also used for the same purpose. Bakers adulterating bread are liable to a penalty of not more than £10 and not less than £5 for every offence, and to have their names advertised in the newspapers. In the making of bread the flour or meal of wheat, barley, rye, oats, buck-wheat, Indian-corn, rice, beans, pease, and potatoes, may be used, along with salt, eggs, water, milk, and leaven or yeast of any kind; but any other ingredient is regarded as an adulteration. All bread except French or fancy bread and rolls must be sold by weight (avoirdupois), and bakers must provide a beam and scales with weights for the purpose of weighing it if required. Bread made wholly or partially of any other flour or grain than that of wheat, must be stamped with the letter M. The penalty of adulterating flour or meal is not more than £20 nor less than £5. Bakers are also prohibited from making bread or rolls on the Lord's-day, and from selling bread, or baking meat, pies, &c., after half-past one o'clock of that day, under a penalty of 10*s.* for the first offence, 20*s.* for the second, and 40*s.* for every subsequent offence. The regulations as to Sunday baking do not extend to Scotland.

BREADALBANE, a district in the western part of Perthshire, in the centre of the Grampians, which here cover a large tract of the county in length and breadth. This district is a complete mixture of high and low hills, yielding pasture for large flocks of sheep or shelter for game, with intermediate valleys, some of which are susceptible of cultivation, while others are merely mosses of peat and heath. Loch Tay lies in the centre of the district. Kenmore and Killin are the largest villages. The Earl of Breadalbane is the chief proprietor.

BREAD-FRUIT. The bread-fruit is a large, globular fruit of a pale-green colour, about the size of a child's head, marked on the surface with irregular six-sided depressions, and containing a white and somewhat fibrous pulp, which when ripe becomes juicy and yellow. The tree that produces it (*Artocarpus incisa*) belongs to the natural order Artocarpaceæ (nearly allied to the Urticaceæ or nettle tribe), and grows wild in Otaheite and other islands of the South Seas. It is about 40 feet high, with large and spreading branches, and has large bright-green leaves, deeply divided into seven or nine spear-shaped lobes. The eatable part of this fruit lies between the skin and the core, and it is as white as snow and somewhat of the consistence of new bread. When gathered it is generally used immediately: if it be kept more than twenty-four hours, it becomes hard and choky. The inhabitants of the South Sea Islands prepare it as food by dividing the fruit into three or four parts and roasting it in hot embers. Its taste is insipid, with a slight tartness, somewhat resembling that of the crumb of wheaten bread mixed with Jerusalem artichoke. Of this fruit the Otaheiteans make various messes by mixing it with water or the milk of the cocoa-nut, then beating it to a paste with a stone pestle, and afterwards mingling with it ripe plantains, bananas, or a sour paste, made from the bread-fruit itself, called *mahie*. It continues in season eight months, and so great is its utility in the island of Otaheite, 'that,' observes Captain Cook, 'if, in those parts where it is not spontaneously produced, a man plant but ten trees in his whole lifetime, he will as completely fulfil his duty to his own and to future generations, as the native of our less temperate climate can do by ploughing in the cold of winter and reaping in the summer's heat as often as these seasons return; even if, after he has procured bread for his present household, he should convert the surplus into money and lay it up for his children.' Not only does this tree supply food, but clothing, and numerous other conveniences of life. The inner bark, which is white and composed of a net-like series of fibres, is formed into a kind of cloth. The wood is soft, smooth, and of a yellowish colour, and is used for the building of boats and houses. In whatever part the tree is wounded, a glutinous, milky juice issues, which when boiled with cocoa-nut oil, is employed for making bird-lime, and as a cement for filling up cracks in such vessels as are intended for holding water. Some parts of the flowers serve as tinder, and the leaves are used for wrapping up food and other purposes.

As the climate of the South Sea Islands is not very different from that of the West Indies, it was thought desirable that some of the trees should be transferred in a growing state to the British islands there; and it was for this purpose that the *Bounty* sailed in 1787

to the South Seas, under the command of the well-known Bligh. This expedition being unsuccessful (see BLIGH), a second, also under Bligh, was fitted out in 1791. He arrived in safety at Otaheite, and after an absence from England of about eighteen months, landed in Jamaica with 352 bread-fruit trees in a living state, having left many others at different places in his passage thither. From Jamaica these trees were transferred to other islands; but the negroes, having a general and long-established predilection for the plantain, the bread-fruit is not much relished by them. Where, however, it has not been generally introduced as an article of food, it is used as a delicacy; and whether employed as bread or in the form of pudding, it is considered highly palatable by the European inhabitants.

BREAKING BULK, the act of beginning to unlade a ship, or of discharging the first part of the cargo.

BREAKWATER, a work constructed in front of a harbour to serve as a protection against the violence of the waves. The name may also be given to any structure which is erected in the sea with the object of breaking the force of the waves without and producing a calm within. Accordingly, many of the jetties and similar constructions in the neighbourhood of harbours may properly be called breakwaters, if they are sufficient to protect the vessels inside them, at the same time that they effect the other purposes for which they are built. Breakwaters are generally solid and made of stone, but there are also floating breakwaters which serve the same purpose. These are built of strong open woodwork, divided into several sections, and secured by chains attached to fixed bodies. Each section is about 80 feet in length, 20 feet in breadth, and 32 feet in depth, of which about 24 are under water. The breakers pass between the beams of such a structure as if through a sieve, and in passage nearly all their force is destroyed. It is estimated that a breakwater of this description will last for twenty-five years. Stone breakwaters are usually constructed by sinking loads of unwrought stone along the line where they are to be laid, and allowing them to find their angle of repose under the action of the waves. When the mass rises to the surface, or near it, it is surmounted with a pile of masonry, sloped outwards in such a manner as will best enable it to resist the action of the waves, or it is covered, as at Plymouth, with large blocks of stone, which do not rise high above the surface of the water. Sometimes the breakwater has to be constructed of solid masonry from its foundation. The breakwater at Dover is built in this way, there being no stone in the neighbourhood to form a base of the kind described. The most gigantic breakwater ever constructed is that which was erected by French engineers to protect the harbour of Cherbourg. The most remarkable of the English breakwaters are those at Portland, Plymouth, and Dover. In America there are breakwaters of immense magnitude at the mouth of the Delaware and Buffalo, the latter intended as a protection against the storms on Lake Erie, which are sometimes very violent. Among the ancient structures of this kind may be mentioned the piers of the Piræus near Athens, and of Rhodes, and also the mole of the harbour of Civita Vecchia (Centumcellæ) built by the Emperor Trajan. See CHERBOURG, DELAWARE, DOVER, PLYMOUTH, and PORTLAND.

BREAM (*Abramis brama*), a species of fish sometimes called carp-bream, belonging to the family Cyprinidæ of the Abdominal Malacopterygii, or fishes with soft rays in their paired fins. It is about 2 to 2½ feet long, of a yellowish-white colour, changing with age to yellowish-brown; pectoral and ventral fins tinged with red; dorsal, anal, and caudal fins tinged with brown. Its scales are large, its irides of a golden yellow, and its cheeks and gill-covers silver white. It is found in many European lakes and rivers, and affords good sport to the angler, but is a very coarse and insipid food. Besides this species other fourteen have been recognized in Europe and the East Indies.—This is also the name of a kind of sea fish generally called the sea-bream, to distinguish it from the common fresh-water or carp-bream. Most of these belong to the family Sparidæ of the order Acanthopterygii, or fishes with spiny rays in their paired fins. One of the British sea-fishes called bream (*Brama Raii*) belongs to the family Chætodontidæ, of the same order as the Sparidæ. Some of the varieties of this fish are the Black Sea-bream, the Common Sea-bream, a fish nearly allied to the Gilthead, the Short Sea-bream, &c.

BREAST, THE FEMALE, is of a glandular structure, containing vessels for the secretion of milk, and excretory ducts, which open by small orifices in the nipple, and discharge the secreted fluid for the nourishment of the child. At the centre of each breast there is a small projection, the nipple, and this is surrounded by a dark ring termed the areola. The nipple is the part which the infant seizes in its mouth, and through the passage of which the milk flows into the mouth of the child in the act of suction. The glandular structure of the breast is covered by fat, except at the fore-part of the nipple and the integument. The breast is liable to many diseases, from irritation during nursing, bruises of the part, undue pressure from tight clothes, and from constitutional causes. Inflammation of the breast is very common during nursing, or from a superabundant secretion of milk. After delivery the nourishment of the infant being from the breast, there is an increased determination of blood to that part to enable it to perform the necessary function, and thus, when there is any cause of irritation, there is a tendency to increased action in that part, which frequently terminates in inflammation. Lacteal swelling is another troublesome disease of the breast. It is confined to the nipple, and consists of a large collection of milk in one of the lactiferous tubes, the orifice of which has been closed from the effects of inflammation.

BREAST-PLATE, a piece of defensive armour covering the breast, originally made of thongs, cords, leather, &c. (hence *lorica*, *cuirass*), but afterwards of brass, iron, or other metals. It may be considered as an improvement of the shield or buckler, which was borne on the left arm, and moved so as to protect successively all parts of the body. It being perceived that the free use of both hands in the employment of offensive weapons was important, the defensive armour, was attached to the body, and received different names from its position, use, &c. as for instance, breast-plate, cuisses, greaves. These different species of defensive armour are of little use against fire-arms, and have therefore generally fallen into disuse in modern war. (See CUIRASS.)—*Breast-plate*, in Jewish antiquity, was a folded piece of rich, embroidered stuff worn by the high-priest. It was set with twelve precious stones bearing the names of the tribes. It was also called the *breast-plate of judgment*, because it contained the Urim and Thummim.

BREAST-WHEEL. See HYDRODYNAMICS.

BREAST-WORK, in the military art, every elevation made for protection against the shot of the enemy. Wood and stone are not suitable for breast-works, on account of their liability to splinter. The best are made of earth; in some circumstances, of fascines, dung, gabions, bags of sand, and of wool. The thickness of the work must be in proportion to the artillery of the enemy. In general it ought not

to be less than 10, nor more than 18, or at most 24 feet thick. The rule of Cugnot is, that the breast-work should be so high that nothing but the sky and the tops of trees can be seen within cannon shot from the interior of the intrenchments. If this rule cannot be followed on account of the height of neighbouring mountains, the interior of the fortification ought to be secured by traverses.

BREATH, the air which issues from the lungs during respiration through the nose and mouth. This operation is performed without effort, but still it causes a motion in the external air, before the nose and mouth. The air expired is the vehicle of sound and speech. A smaller portion of oxygen and a larger portion of carbonic acid is contained in the air which is exhaled than in that which is inhaled. There are also aqueous particles in the breath, which are precipitated by the coldness of the external air, in the form of visible vapour; likewise other substances which owe their origin to secretions in the mouth, nose, windpipe, and lungs. These cause the changes in the breath, which may be known by the smell, like the other qualities of the air. In youth, the breath is insipid, and contains acid; it loses these qualities after the age of puberty, and becomes more agreeable. With advancing age, it becomes again unpleasant. A bad breath is often caused by local affections in the nose, the mouth, or the windpipe; viz. by ulcers in the nose, cancerous *polypi*, by discharges from the mouth, by sores on the lungs, or peculiar secretions in them. It is also caused by rotten teeth, by impurities in the mouth, and by many kinds of food (viz. horse-radish, onions, and also by flesh, if used to the exclusion of other food), and by fevers. In the last case it often varies with the character of the disease. The remedy for this complaint must depend on the causes which produce it. Substances of an aromatic kind, which have a strong rich smell, should be chewed to diminish its offensiveness. But it is often impossible to remove this unpleasant disorder.

BREATHING. See RESPIRATION.

BRECCIA, a conglomerate composed of angular pieces of the same or of different rocks, united by a cement or matrix, which, according to its nature, forms the several varieties of calcareous, silicious, &c. The conglomerate known by the name of *pudding-stone* differs from that of breccia only in having the composing fragments rounded. Calcareous breccia is often found in the form of fine marble, apparently composed of fragments produced by some disrupting force, and then united by the infiltration of carbonate of lime among them. The angular form of the fragments seems to indicate that they have never been exposed to much friction, and have therefore probably originated at no great distance from their present site. In some cases a kind of spurious breccia has been formed by the breaking up of calcareous beds, and their subsequent union by means of infiltration, without any change of their original position. Marble breccia thus formed is remarkable for the size of its fragments. In the calcareous districts of many countries caverns and extensive fissures are seen filled with a reddish mass, composed of lime, sand, and oxide of iron, inclosing angular fragments of different rocks and a great number of bones more or less broken. To such masses the name of *osseous breccia* has been given. They are most frequently met with on the shores of the Mediterranean.

BRÈCHE-DE-ROLAND, that is, 'the breach of Roland,' a mountain pass in the Pyrenees, between France and Spain, which, according to a well-known legend, was opened up by Roland, one of the paladins of Charlemagne, with one blow of his sword Durandal, in order to afford a passage to his army. It is an immense gap between the walls of a mountain barrier rising to the height of 9500 feet above the level of the sea, and from 300 to 600 feet above the bottom of the defile. The defile itself varies in width from 200 to 300 feet. It lies about 43 miles to the N. of Huesca, from which it can at times be seen, when it appears like a small notch in a stony ridge. The violence of the wind in this pass is described as being in tempestuous weather truly terrific. It is now a great resort of smugglers.

BRECHIN, a royal and parliamentary burgh of Scotland, in Forfarshire, is romantically situated on the left bank of the South Esk, 12½ miles N.E. of Forfar, and 8 W. of Montrose. The principal street is about 1 mile in length, extending from the N. part southward to the bridge over the river, which is an old fabric of two large arches. Another street branches off this, about the middle of the town, and stretches in a south-easterly direction for more than ½ mile. There are also several cross streets and by-lanes. Brechin is a very ancient royal burgh, and was formerly walled. The trade carried on in Brechin consists chiefly of the manufacture of linens, and the neighbourhood exports a considerable quantity of grain. There are in the town several extensive factories, a flax-spinning mill, two nurseries, a brewery, a distillery (another distillery is close to the town), and a paper-mill. In ancient times there was an abbey of Culdees in this place, and in 1150, when Brechin was constituted an episcopal see by David I., it is supposed that the site of this establishment was that chosen for the foundation of the cathedral. The cathedral church of St. Ninians, which now forms the parish church, is situated on the N. edge of a precipitous ravine, which separates the burgh-lands from those of Brechin Castle. It was originally a stately Gothic fabric, but its architectural symmetry has been greatly injured by the bad taste displayed in modern repairs. The steeple is a square edifice 70 feet in height, surmounted by a hexagonal spire of 50 feet. Contiguous to it, at the S. angle, stands the tall slender tower of Brechin, which, like the only other Scottish round tower—namely, that at Abernethy—has puzzled so many antiquaries. It is an unadorned turret of freestone, 86 feet 9 inches high to the cornice, and 15 feet more to the pinnacle of the modern spire on its top. The Mechanics' Institution, which contains the grammar and parish schools, is a handsome building. It has a library and some interesting historical portraits. Between the town and the river, and only separated from the former by the before-mentioned ravine, stands Brechin Castle, the ancient seat of the Maules of Panmure. The castle is built on a precipitous rock overhanging the stream. Pop. of parl. burgh in 1861, 7179; in 1871, 7959.

BRECON, or BRECKNOCK, a county of South Wales, having a length from N. to S. of 38 miles, with a breadth varying from 14 to 34 miles; an area of 719 square miles, and a pop. of 59,904. It is one of the most mountainous counties of the principality, and presents much bold and magnificent scenery. Near its centre rises the mountain called the Van or Beacon, belonging to the Black Mountains, which traverses its S. portion from E. to W., has a height of 2862 feet, and is the culminating point of South Wales. Its rocks belong chiefly to the old red sandstone or Devonian system; but it also contains a considerable development of mountain limestone and a small and inferior portion of the great Welsh coal-field. Notwithstanding the rugged nature of the surface, not much less than a half of the whole is under cultivation. The river Wye forms a natural boundary between this county and Radnor, and the Usk, rising in the

Black Mountains, crosses the county and flows through a fine valley towards the town of Brecon. About 2 miles E. from the latter is Brecknock Mere, one of the largest lakes in South Wales, abounding in otters, pike, tench, perch, and eels. The climate is in general temperate and salubrious. A considerable quantity of agricultural produce is sent to the markets in the neighbouring English counties. The chief manufactures are coarse woollens, stockings, and other worsted stuffs; there are also extensive iron-works.

BRECON, the capital of the above county, stands near its centre, in an open valley at the confluence of the Honddu and Usk, and consists of three principal and several minor streets, tolerably straight and well built. The principal edifice is the county-hall, a handsome modern structure in the Grecian style. It has three churches, one of which, the priory church, is a fine structure, partly Norman and partly English in style. The only manufactures are a few flannels and coarse woollen cloths, and there are three weekly markets, and annual fairs for hops, leather, cattle, &c. Brecon returns a member to the House of Commons. Mrs. Siddons, the celebrated actress, was born here. Pop. in 1871 (mun. bor.), 5845; (parl. bor.), 6291.

BREDA, in the Netherlands, capital of a district of the same name, is connected with the Meuse by the navigable river Merk. Pop. at the end of 1868, 15,265. Breda, being a strong frontier fortress, was formerly of the greatest importance to Holland, and is still of great military value as the chief point of the line of fortresses before the Meuse. The fortifications consist of fifteen bastions, as many ravelins, and five horn-works, besides the citadel. The chief strength of this fortress lies in its marshy environs, which may easily be laid under water. Breda became a town in 1534: since that time it has often been a subject of contention between the Dutch, Spaniards, and French. It was delivered by treachery into the hands of the Duke of Parma in 1581, but was retaken by Maurice of Orange in 1590. The latter capture was accomplished by means of a boat loaded with turf, in which seventy Dutch soldiers were concealed. Spinola took Breda in 1625, after a siege of ten months, but it was retaken by the Dutch under Frederick Henry of Orange, in 1637. During the French revolutionary war Dumouriez made himself master of the city and fortress in February, 1793, and would thereby have prepared the way for the conquest of Holland had he not been forced, by the loss of a battle at Neerwinden, to evacuate the city and fortress, April 4. In September, 1794, Breda was attacked by the army of Pichegru, but did not surrender till all Holland was conquered, in the winter of 1794. On the approach of the Russian vanguard, under General Bonkendorf, in Dec. 1813, the French garrison made a sally, and the patriotic citizens, profiting by the occasion, rose *en masse*, shut the gates, and prevented the French from returning into the town. A peace was concluded at Breda between England and Holland in 1667.

BREDA, JAN VAN, a painter, born at Antwerp in 1683; died 1750. He studied at first under his father, who had acquired some reputation, but afterwards became a close imitator of Breughel de Velours and Wouvermans, of whose works he made copies, which the most practised eye is scarcely able to distinguish from the originals. He resided several years in England, where he enjoyed a high name, and was much employed by the king and the nobility. On his return in 1725 he was appointed director of the Academy of Antwerp, and was so highly valued by his townsmen that his paintings were often the objects of keen competition.

BREDOW, GABRIEL GODFREY, professor of history in Breslau, was born in Berlin in 1773, of poor parents. He died in 1814. He was for a time professor at Eutin, and a colleague of the celebrated Voss; afterwards professor at Helmstadt, and still later at Frankfort-on-the-Oder, whence he went to Breslau on the removal of the university to that place. He was distinguished for his patriotism and his literary works. His Handbuch der alten Geschichte (Manual of Ancient History) has passed through five editions, the fifth of which appeared in 1825. He is the author of Chronik des Neunzehnten Jahrhunderts (Chronicle of the Nineteenth Century); Epistolæ Parisienses (he went to Paris in 1807 to collect all that has been left to us by the Greek geographers); Untersuchungen uber Geschichte, Geographie, und Chronologie (Researches on History, Geography, and Chronology); and of the very useful Historische Tabellen (Historical Tables), which have been translated into English.

BRÉE, MATTHÆUS IGNATIUS VAN, a Belgian painter, was born at Antwerp in 1773, and died there in 1839. He studied at the Academy of Antwerp, and under Vincent at Paris. He chiefly excelled in historical painting, for which he gained a prize in 1797. His characteristics are said to have been originality and vigour of conception and patience in execution, yet he worked with great rapidity, as he presented Napoleon in a few hours a tableau of the manœuvres of the fleet on the Scheldt before Antwerp. His first work which attracted attention was the Death of Cato. Among his principal works are: Rubens Dictating his Dying Testament; The Tomb of Nero at Rome, with a group of itinerant musicians and Lazaroni; Death of Count Egmont; Van der Werff addressing the famished Populace during the Siege of Leyden in 1576—the burgomaster is represented as saying, 'Take my body and divide it amongst you.' Van Brée had the title of painter to the Empress Josephine, and represented many scenes connected with the French occupation of Belgium. He replaced Herreyns as director of the Academy of Fine Arts at Antwerp, and gained a high reputation by his teaching. He also evinced a capacity to excel in sculpture and lithography.

BREECH OF A GUN and BREECH-LOADING. The breech is the solid mass of metal behind the bore by which the shock of the explosion is principally sustained. The earliest cannon were made to load at the breech, but as this was found to weaken the gun, muzzle-loading was subsequently adopted. In small arms the advantages of breech-loading for rapidity of fire, facility of cleaning, &c., have recently recommended it to general use, and the introduction of a new mode of discharging such arms in the needle-gun has so greatly enhanced the rapidity of fire in the breech-loader, that for warlike purposes it has become irresistible; and since this was demonstrated in the successful campaigns of Prussia against Denmark and Austria in 1864 and 1866, every government has been eager to adopt them. The British government adopted the Snider process for converting their Enfield rifles into breech-loaders in 1866; more recently the Martini-Henry pattern was selected for the manufacture of new rifles. The chief difficulty in breech-loading is to close the breech so as to prevent the escape of the highly elastic gas to which the force of the explosion is due. The appliances of modern science and mechanical art may be said to have effectually met this difficulty in the case of rifles, and breech-loaders are now generally adopted for field-sports as well as in military service, although some sportsmen still prefer muzzle-loading for accuracy of aim in small-bore rifles. Breech-loading in cannon has not yet been found so effective as in small arms. It has been extensively employed on the Continent,

especially for field-guns, and patents have been taken out in this country by Armstrong, Whitworth, and others, for the construction of breech-loading cannon, which have been tried both in the army and navy. A report presented in 1871 to both houses of Parliament by a special committee of military officers appointed by the secretary of state for war, reported with one dissentient in favour of a 9-lb. muzzle-loading gun in preference to 9 and 12 lb. breech-loaders. See CANNON, GUN, NEEDLE-GUN, &c.

BREECHES, an article of clothing in use even among the Babylonians, and which, with them, were made so as to cover the foot and supply the place of stockings. In Europe we find hose first used among the Gauls; hence the Romans called a part of Gaul *breeched Gaul* (*Gallia braccata*). In the fifth century they had become fashionable in Rome; but the breeches-makers were expelled from the city by an imperial edict, it being considered unworthy of the lords of the world to wear these barbarous investments. The stockings were separated from them some centuries since. Sometimes they were worn small, and sometimes large, as the fashion changed. In some instances an immense quantity of cloth was put in them. The poor stuffed theirs out with such substances as they could procure. Joachim II., elector of Brandenburg, who had forbidden the wearing of these enormous integuments, made a person whom he saw with a pair rip them open, when some bushels of bran fell out of them. Osiander (in his Hoffahrtsteufel) and Musculus (in his Hosenteufel) raised their voices against this preposterous fashion. The modern breeches were first introduced during the reign of Louis XIV.

BREECHING, a rope used to secure the cannon of a ship of war, and prevent them from recoiling too much in the time of battle. It is of sufficient length to allow the muzzle of the cannon to come within the ship's side to be charged.

BREEDING is the art of improving races of domestic animals by continuous attention to their pairing, in conjunction with a similar attention to their feeding and general treatment. Both plants and animals show great susceptibility of modification under systematic cultivation. We owe our cereals, our most important garden herbs and fruits, and our finest flowers to the continued cultivation of wild stocks, which in their original form bore but slight resemblance to, and gave few indications of, the qualities of the perfected specimens. In animals the same susceptibility of modification exists to so great an extent that it would almost seem, on looking in the gross at what has been accomplished by it, to be unlimited. Experience, however, shows that great as are the results of systematic breeding, there are well-defined limits to its power; and that its application is attended with many difficulties, even the very ease with which modifications may be produced rendering it liable to abuse; for in breeding the difficulty is not merely to effect changes, nor even to effect them continuously in a desired direction, but to select with proper judgment and due forethought of both near and remote consequences the directions in which it is most desirable to effect them. Both cultivators of plants and breeders of animals, when very desirous of producing a particular quality in great perfection, frequently sacrifice other qualities unduly to it. This may be done to such an extent as to hazard even the permanence of the quality preferentially developed by destroying the basis on which it rests. The tendency to do this is in fact one of the best-defined limits to the power of breeding. There can be no doubt that by long and systematic cultivation the sum of desirable qualities in particular races, both of plants and animals, has been greatly increased, and that in two ways. Individual specimens have been produced possessing a much higher sum of desirable qualities than any specimens of the original stock could have exhibited; and from the same stock many varieties have been taken, developing different perfections, the germs of all of which may have been contained in the original stock, but which it would have been impossible to develop simultaneously in a single specimen. But when an effort is made to develop rapidly, or to its extreme limit, any particular quality, it is always made at the expense of some other quality, or of other qualities generally, by which the intrinsic value of the result is necessarily affected. High speed in horses, for example, is only attained at the expense of a sacrifice of strength and power of endurance. The celebrated merino sheep, from which the fine wool of Saxony is taken, are the result of a system of house breeding which reduces the general size and vigour of the animal, and diminishes the value of the carcass. When animals are bred, as in this country, for supplying the market with meat, the yield can, on the contrary, be greatly increased by stall-feeding; but the flavour of meat so produced, however fine its appearance, is never equal to that of free animals, and genuine quality is sacrificed to quantity. In seeking to effect improvement by breeding or cultivation, therefore, much care and judgment are needed to calculate not merely how a particular effect may be produced, but how it may be produced with the smallest sacrifice, and so as to leave the greatest balance of advantage in favour of the improver.

Breeding, as a means of improving domestic animals, has been practised more or less systematically wherever any attention has been paid to the care of animals. The great number of varieties to be found among horses, dogs, pigeons, and other domestic animals, is in great measure to be attributed to the care of breeders. It is not from any theory, but from common observation, that a knowledge of the advantages of a regular attention to breeding has been derived, and the facility with which it may be used as a means of effecting given purposes has always been readily discovered by those who have paid attention to the subject. It is only within the last century, however, and in particular in connection with the improvement of the breeds of cattle and sheep, that the subject has received much attention as one of distinct scientific investigation in this country. The attention of rearers of sheep and cattle has for about that period been greatly turned to the advantages of breeding. One of the earliest improvers, and to whom more than any one else the opening up of the new era was due, was Robert Bakewell, of Dishley, in Leicestershire. Commencing his experiments about 1745, he found at that time no general attention paid to the different breeds throughout the country. Every district had its own particular ideas of excellence, and generally confined itself to its own breed, many of which were very inferior. Bakewell took at once a mercantile view of the subject, and urged the general cultivation of those qualities which were best suited for producing profitable results. He travelled the country, disseminating his principles, and he succeeded, after great sacrifices, in producing, besides other improvements in cattle and horses, the celebrated Dishley breed of Leicestershire sheep, which has since maintained a high reputation. Bakewell's principle in forming his stock was to aim at producing 'fine forms, small bones, and a disposition to make fat readily.' More recently the subject of breeding has been much discussed by theorists as well as by practical breeders. The result of investigation has been to show that in the course of the improvements effected, there has often been a great

waste of power. One improver, for example, has sacrificed the wool of a particular breed of sheep to the carcass; another has subsequently improved the wool but diminished the yield of meat, the facility with which different objects might be accomplished thus often leading to more fluctuation in the aims of the breeders than was consistent with steady improvement. Thus much has been ascertained by the general observation of results, and a few leading principles have been laid down, but little exact knowledge has been acquired as to how the improvements of breeding are effected. Opposite theories are contended for with equal zeal, while the practical skill of the experienced breeder appears to derive little assistance from either, successful experiment as well as opinion being ranged on both sides of the question. Breeding is thus still to a great extent a matter of individual judgment and experience, even those who know most about it differing in their explanation of the facts, and of the causes to which they assign their own improvements. In this state of matters we shall indicate briefly a few of the leading facts and opinions in regard to the remarkable improvement which has been effected in the breeds of sheep and cattle in this country, which has made our stock the wonder and admiration of other countries.

That a great and general improvement in the size, weight, and quality of our sheep and oxen has been effected, is undoubted; and it is equally undoubted that this improvement has been due to the continued application of the skill of practical breeders. This is proved by the fact that improvement has closely followed the state of our markets. The impress which Bakewell gave to the movement has continued more consistently than any other characteristic which has attended it. Quantity of meat, smallness of bone, lightness of offal; in cows, yield and quality of milk; in sheep, weight and fineness of wools, have all been studied with remarkable effects; but those who have had occasion to observe the details of the improvements, will find in all of them a close relation to mercantile value. In particular cases, cows have been made to yield milk much superior to the general quality, but the quantity of the yield in these cases is limited, and improvement in this direction has consequently been restricted. Experiment has shown that British sheep can be made to yield longer and finer wool than is usually taken from them; but with the British cost of feeding, and with the British market for meat close at hand, the inducement to bring wool to the highest attainable perfection is outweighed by the immediate advantages of a good yield of fair quality, together with a valuable carcass. On the other hand, it pays eminently to bring sheep and oxen early to the market, and the age at which an animal reaches full condition has been considerably advanced in this direction. While an improvement such as this affords abundant evidence of the great susceptibility of change in animal nature, it is less conclusive in regard to the settlement of first principles than a similarly extensive experiment conducted on a purely theoretical basis might have been. It is therefore the less surprising to find differences of opinion on theoretical points. One point may be stated with confidence as generally admitted, and as the true basis of practical improvement; and beyond this it is scarcely safe to go. It is on the individual selection of suitable animals that the improvement of qualities transmitted by descent must rest, and the more gradual the stages of improvement are—that is, the more similar the breed of the animals possessing distinctive differences—the more surely may the improvement be maintained and transmitted in succeeding generations. This fundamental principle gives a standing-point to the advocates of both the opposite theories of *in-and-in* and cross breeding. Theorists generally are opposed to the former, and it is commonly held by them as tending to degeneracy. This is stoutly denied by some practical breeders, and not without an appearance of facts on which to rest their opinion. If *in-and-in-breeding* has its dangers, it cannot be denied that cross-breeding has its. When the breeds are too dissimilar, there is always a tendency in subsequent generations to relapse to their former types. There is the still greater danger when the breed experimented upon has valuable qualities, of sacrificing them for a doubtful equivalent. The number of experiments frequently made in opposite directions has already been alluded to as an abuse to which cross-breeding is liable. When the practice of breeders is dominated by a general principle, such as the mercantile desire of profit alluded to, there is a further danger, not perhaps sufficiently considered, of destroying original types, and bringing the qualities of the different breeds into a dead level of uniformity. This may seem inconsistent with the variety of practice just referred to, but is not really so. Although starting on different roads, and sometimes in diverging directions, our breeders all tend to the same point, and ultimately reach it by abandoning their divergences. The tendency of modern breeding, like many other tendencies of civilization, is more and more to the production of uniform types. The history of the different British breeds affords some curious instances of the rapid and extensive conquest of superior over inferior breeds; and the same process is still going on, governed by the same principle, an exact calculation of the mercantile returns of each breed. If this calculation always comprehended every element of ultimate value, there would be no danger, as differences of locality would condition difference of breed; but mercantile calculations are not usually so profound, and their tendency hitherto has been in the direction of levelling distinctions. All the desirable qualities of a species, as has been already mentioned, are not, however, developed in a single variety. The gardener, whose glory it is to produce every possible development of beauty in the forms of his plants, is in no danger of forgetting this. The breeder of cattle, who looks to an immediate return for a large quantity of cheaply fed meat, is very differently situated. Perhaps the dangers of *in-and-in-breeding* are associated more than is suspected with the practice of castration, which forms so universal a part of the artificial treatment of domesticated, and especially of gregarious animals, and which in the course of a few generations must bring the stock of a particular owner into the closest consanguinity. If this is so, probably many of the advantages of cross-breeding might be gained without destroying particular breeds by frequent and judicious interchanges among neighbouring breeders. When there is a deficiency of desirable qualities in any breed, there can be no risk in having recourse to cross-breeding; but when a particular breed, such as our West Highland cattle, possesses high excellencies, it is probably safer to leave them undisturbed. For an account of the different breeds of British cattle and sheep, see Dr. MacDonald on Cattle, Sheep, and Deer (London, 1872).

BREEZES, Sea and Land. See Wind.

BREGENZ (ancient *Brigantium*), a town of the Austrian States, Vorarlberg, 77 miles W. by N. Innsbruck, with 3451 inhabitants. It occupies a beautiful site on a slope, which rises from the Lake of Constance, and terminates on Mount Gebbard, where the ruins of the ancient stronghold of the Counts of Montfort are still seen. It consists of an old town, which is very poorly built, and a modern, which is more attractive. Among its edifices are three churches

and two monasteries. Its chief manufacture is framework and other wooden fittings for houses, and it trades in corn, fruit, wine, butter, and cattle. There are saltpetre works, blast furnaces, and coal-mines in the vicinity.

BREHON, an ancient magistrate among the Irish. The name (Irish, *Breitheamhuin*) is supposed to be derived from Vergobretus, the name of a similar magistrate among the Ædui of Gaul. These magistrates were hereditary, and had lands assigned for their maintenance. They administered justice to their respective tribes—each tribe had one brehon—seated in the open air upon some sods placed on a hill or eminence. Spenser in his View of the State of Ireland refers to the Brehon law as an unwritten code handed down by tradition. He expresses no favourable opinion of it either in regard to the distribution of property or the security of life. In his view of the practical working of the law he was probably right, but he was mistaken in regarding it as an unwritten code. Patriarchal as was the administration of the Brehon law, its transmission was not left to tradition. It had been reduced to writing at a very early period. In the earliest manuscripts extant it is said to have been revised by St. Patrick and other learned men, who expurged from it the traces of heathenism, and formed it into a code called the Senchus Mor, about 440, and it is implied that a previous written code existed. The Brehon law was exclusively in force in Ireland until the year 1170. Various ineffectual attempts were made by the English government to suppress it, by the statute of Kilkenny (Edward III.), 1366, by acts of Henry VI., in 1440 and 1450. It was finally abolished by James I. in 1605. The Brehon laws, like other laws passed at the same period of European history, contained, with some rude principles of justice, many barbarous institutions. Murder was commuted by a fine, which was divided between the judge and the family of the deceased. Property was regulated by a law of gavelkind. When a member of a family died, a gavel or repartition of the property was made by the chief of the tribe among its members. Until recently these laws have been involved in great obscurity. A commission was appointed by the Earl of Eglinton, as lord-lieutenant of Ireland, in 1852, to superintend the publication and translation of the ancient laws of Ireland; and the publication of the Senchus Mor was commenced in 1869. Many spots are yet shown in Ireland called *Brehons' chairs*.

BREISGAU. See BRISGAU.

BREISLAK, SCIPIO, a distinguished geologist, born at Rome in 1768; died in 1826. He was professor of mathematics first at Ragusa, and subsequently at the Collegio Nazareno of Rome. Napoleon appointed him inspector of the saltpetre-works and powder-mills in the Kingdom of Italy. As a geologist he combated the theory of the Neptunists without committing himself to the Vulcanian theory. He was a member of the Royal Italian Institute, and of the Royal Societies of London, Berlin, Munich, and Edinburgh. His principal works were Topografia, Fisica della Campagna, 1798; Introduzione alla Geologia, 1811; Descrizione Geologica della Lombardia, 1822.

BREITENFELD, a village of Saxony, in the circle of, and 4 miles N. of Leipzig. Here two battles were gained by the Swedes during the Thirty Years' war. In the first, fought on 7th Sept. 1631, Gustavus Adolphus, joined by the Saxons, defeated Tilly and Pappenheim; in the second, on 23d Oct. 1642, Torstenson, who had succeeded on the death of Baner to the command of the Swedish army in Germany, again defeated the Imperialists under the Archduke Leopold and Piccolomini, who had advanced to the relief of Leipzig, invested by the Swedes. Leipzig surrendered after the battle. Breitenfeld was the scene of a portion of the battle of Leipzig, won by the allies against Napoleon, 16th to 19th October, 1813.

BREMEN, a free city of Germany, and an independent member of the empire, one of the three Hanse towns, is situated on the Weser, about 50 miles from its mouth, in its own small territory of 98 square miles, besides which it possesses the town and port of Bremerhaven at the mouth of the river. The town is divided into the old town (Altstadt), the new town (Neustadt), and the suburbs (Vorstadt). The last is separated from the first by the ramparts of the city, now converted into fine walks and pleasure-grounds, and both these form a semicircle on the right bank of the river. The new town lies on the left bank of the river opposite the old, from which it is connected by three bridges, two of them crossing the main stream, and the third crossing an arm of it called the Little Weser. The streets of the old town are narrow and crooked, and lined with antique houses in the style of the middle ages. This is the business quarter of the city, and contains the chief public buildings, including the cathedral, founded about 1050, the old Gothic council-house, with the famous wine-cellar below it, the town-hall, the *Schütting* or merchants'-house, and the old and the new exchange. The new town has straight well-built streets lined mostly with dwelling-houses and shops. The Vorstadt also consists chiefly of dwelling-houses, and as these often have gardens in front, the streets have a very pleasant aspect. The whole town is kept very clean. There are several squares and open spaces, and besides the pleasure-grounds formed from the ramparts, a large public park has been laid out on the N. side of the town. Bremen is well supplied with schools and other educational institutions, and possesses a museum, a library, an observatory, a theatre, &c. The manufacturing establishments consist of tobacco and cigar factories, sugar-refineries, rice-mills, iron-foundries, and machine works, rope and sail works, and ship-building yards. It is from its commerce, however, that Bremen derives its importance. Its situation renders it the emporium of Hanover, Brunswick, Hesse, and other countries traversed by the Weser, and next to Hamburg it is the principal seat of the export and import trade of Germany. Only small vessels can come up to the town itself; others of a larger size may come as far as Vegesack, but the great bulk of the shipping trade centres in Bremerhaven and Geestemunde. Bremerhaven is now a place of over 10,000 inhabitants, and is provided with excellent docks capable of receiving the largest vessels; it is connected by railway with Bremen, where the chief trading companies, merchants, and brokers have their offices. The greater portion of the German trade with the United States passes through Bremen, and it is the chief port of emigration on the Continent. The chief imports are tobacco, raw cotton and cotton manufactures, wool and woollen manufactures, rice, coffee, grain, petroleum, &c., which are of course chiefly re-exported to other parts of Germany and the Continent. The imports in 1871 were of the value of £22,821,000; the exports, of £21,013,000. The pop. of the town in 1871 was 82,950; of the total territory (including Bremerhaven), 122,565.

Bremen first rose into note about 788, when it was made the seat of a bishopric by Charlemagne. It was afterwards raised to the dignity of an archbishopric, and by the end of the fourteenth century it had become virtually a free imperial city. At the treaty of Westphalia in 1648 the archbishopric was secularized, and became a duchy under the supremacy of Sweden. In 1731, when the Elector of Brunswick gained possession of the duchy, the privileges of

Bremen as a free city were confirmed. From 1810 to 1813 it formed part of the French Empire. The constitution is in most respects republican. The government is composed firstly of the senate, a body of eighteen elected for life, and presided over by two of their own number alternately, who have the title of burgomaster; and secondly, of an assembly of 150 citizens elected for six years.

BREMER, FREDERIKA, a Swedish novelist of European reputation, born near Abo in Finland in 1802; died 31st December, 1865. At the age of eight she wrote verses both in Swedish and French. In 1814 she visited Paris, and at subsequent periods of her life, up to 1861, she travelled in America, England, Switzerland, Italy, Turkey, Greece, and Palestine. She also resided for some time in Norway. She has written an account of her travels; but her fame chiefly rests on her novels, which depict with great simplicity, tenderness, and humour the manners and life of Sweden and Norway. They have been translated into German, French, and English. Towards the close of her life a revolution took place in her style, and her works began to be distinguished by the advocacy of particular religious and philanthropic views. They are said at the same time to have lost much of their charm and popularity. She has, however, exercised some influence in her own country as a social reformer. The English titles of some of her principal works are The President's Daughters, The Neighbours, Nina, and Strife and Peace.

BREMER, SIR JAMES JOHN GORDON, Rear-admiral of the Blue, distinguished for his services in China, was born in 1786, and died in 1850. He entered the navy in 1794, and in 1814 became a post-captain. After various services, he was appointed to the command of the naval forces in India on the death of Sir J. L. Maitland, and co-operated with Sir Hugh Gough in the capture of Canton in 1841, for which he received the thanks of Parliament.

BRENNER, MOUNT, a mountain in the Tyrol, situated between Innsbruck and Sterzing, and between the rivers Inn, Aicha, and Adige, forming part of the Tyrolese Alps, 6777 feet in height. The road from Germany to Italy traverses this mountain. It reaches the elevation of 4658 feet, and is about 12 miles long. This is one of the lowest roads practicable for carriages over the main chain of the Alps, and also one of the most ancient, having been used by the Romans. The Brenner was the chief position for the defence of the Tyrol during the revolution of the Tyrolese in 1809. They defended themselves gallantly in this place against the Bavarians and French, cutting off their communication with Italy. In 1867 a railway over the Brenner Pass was opened, so that Italy and Germany are connected with an unbroken line of rails. See ALPS—Roads over.

BRENNUS, the name or title of several princes of the ancient Gauls, supposed to be derived from the Kymrian *brenhin*, a king. A leader of the Senones, a Gallic nation in the upper part of Italy, the most famous personage who is mentioned under this name, made an invasion into the Roman territory about the year 390 B.C. Having conquered the whole of Etruria from Ravenna as far as Picenum, he laid siege to Clusium, the inhabitants of which city had recourse to Rome for assistance. Incensed by the breach of faith of the Fabii, the Roman ambassadors, in conducting a sally from the city, Brennus raised the siege of Clusium and directed his march towards Rome. A battle was fought near the river Allia, the Romans were totally defeated, and Brennus took possession of the city, which had been previously abandoned by the inhabitants. The capitol only was provided with a garrison; but several aged citizens of rank, priests, ex-consuls, and generals, amounting in the whole to about eighty, had resolved to remain in the city and devote themselves to the infernal deities. Attired in their sacerdotal, consular, and triumphal robes, they seated themselves in their chairs of office, in the middle of the forum, awaiting death. When Brennus arrived at the forum, he was struck with astonishment at their venerable aspect. The Gauls looked upon them as so many statues of deities, and feared to go near them. At last one ventured to approach M. Papirius, and stroke his beard, upon which the latter struck him with his ivory sceptre, and was immediately massacred together with his companions, by the infuriated Gauls. Rome was sacked, and all the inhabitants who yet remained in their houses were slain. Brennus then assaulted the capitol, and being repelled with considerable loss, he set fire to the city, and levelled it with the ground. The capitol, however, was so strong that he resolved to reduce it by famine. While the garrison of the capitol was in great distress Brennus attempted a surprise by night, in which he would have succeeded had not the cackling of the geese, sacred to Juno, awakened the Romans. Manlius, the former consul, alarmed the garrison, and the Gauls were repulsed. After six months' siege, the garrison being disposed to treat, Brennus offered to raise the siege and leave the Roman territory for 1000 lbs. of gold. The gold was weighed, but the Gauls made use of false weights; and when the Romans complained of the fraud, Brennus threw his sword into the scale and cried out, 'Woe to the vanquished!' According to Polybius the Gauls returned home in safety with their booty. The Roman legend followed by Livy bears that Brennus was defeated, and his army entirely destroyed, by Camillus, a distinguished Roman exile who had retired to the city of Ardea, and who arrived with succour in time to save the capitol. Another Brennus invaded Greece, B.C. 279, gained a victory over Ptolemy in Macedonia, returned home with his booty, and again advanced southward with an enormous force, said to have amounted to 150,000 foot and 61,000 horse. After ravaging Macedonia he entered Thessaly and marched towards Thermopylæ, where an army of 20,000 Greeks was assembled, supported by an Athenian fleet on the coast. The Gauls were repulsed in a sanguinary battle, but, in order to separate the Greeks, they dispersed themselves to plunder the country. Brennus himself attacked the temple of Delphi, which was defended by only 4000 men, but was again repulsed, and carried out of the battle fainting with his wounds. Unwilling to survive his defeat, he put an end to his life by copious draughts of wine. The Greeks attributed their victory to the assistance of Apollo.

BRENTA (ancient *Medoacus Major*), a river in North Italy. Its source is Lake Caldonazzo in the Tyrol, 8 miles S.E. of Trent, whence it flows S.E., with a winding course of 112 miles, and falls into the Adriatic through the canal of Brenta-nova or Brentono, at Brondolo. Formerly its embouchure was at Fusina, opposite Venice. The old course has been formed into a canal, and is the chief means of communication between Padua and Venice. The Brenta is navigable for 46 miles, but the new channel is comparatively little used.

BRENTANO, CLEMENS, a German poet and romancer, was born at Frankfort-on-the-Main in 1777; died at Aschaffenburg in 1842. He studied at Jena, and resided alternately there and at Frankfort, Heidelberg, Vienna, and Berlin. In 1818 he retired to the convent of Dülmen, in Münster, and the latter years of his life were spent at Ratisbon, Munich, and Frankfort-on-the-Main. These frequent changes

were due to a restless disposition, combined with morbid and misanthropic views, which gave a peculiar character to his writings. With a powerful imagination, his genius was tinged with mysticism, eccentricity, and a strong tendency to sarcasm: He was the brother of Elizabeth von Arnim, Goethe's 'Bettina.' Among his principal works are—Satiren und Poetische Spiele, 1800 (Satires and Poetical Fancies); Godwi, oder das Steinerne Bild der Mutter, 1801 (The Mother's Statue), an ultra-romantic production, which he himself calls a very wild romance; Die Lustigen Musikanten, 1803 (The Joyous Musicians); Ponce de Leon, 1804; Die Gründung Prags, 1816 (The Founding of Prague), said to be his most successful drama; Gokel, Hinkel, und Gakeleia, 1838, a satire on the times; Geschichte vom braven Kaspar und dem schönen Annerl (History of the Brave Caspar and the Beautiful Annerl, 2d edition, 1851), which is considered a masterpiece as a novelette.

BRENTFORD, the county town of Middlesex, England, 7 miles W. of London. It has a weekly market and two annual fairs. Here Edmund Ironside defeated the Danes, under Canute, in 1016; and Prince Rupert a part of the Parliamentary forces, under Colonel Hollis, in 1642. The magnificent edifice of the Duke of Somerset, where Lady Jane Grey resided, now belonging to the Duke of Northumberland, was built here on the site of a suppressed nunnery. Brentford has a considerable retail trade, distilleries, a soap manufactory, and extensive sawing and planing mills. Pop. of Old and New Brentford in 1871, 11,091.

BRENT GOOSE (*Anser Brenta* or *Bernicla*) is a wild goose of the barnacle family, which frequents our coasts during winter. The barnacles are distinguished from the common goose by a shorter and slenderer bill, the edges of which cover the extremities of the laminæ. Some naturalists make of them a distinct genus, but as the varieties shade into one another, and cannot be distinguished by a complete line of separation, the division is usually rejected. The barnacle geese generally have the beak short, slender, convex, and truncated, with edges laminated internally, but not visibly from the exterior. The common barnacle (*A. leucopsis*) is much smaller than the grey goose. The back is of an ashy grey, variegated with black; the face and neck pure white; neck and tail black. An old fable made it grow on the trees like a fruit; it was consequently eaten during Lent. The brent goose is still smaller, and lighter in proportion to size. The back is of a very deep grey; the head, neck, and upper part of the breast black; a spot on each side of the neck, and the under feathers of the tail, are pure white; the belly is white; the bill and feet black. The brent goose is migratory, and is remarkable for length of wing, powerful flight, and extent of migratory power. It is a winter bird of passage in many parts of the continents of Europe and America, particularly France, Germany, Holland, Great Britain, the United States, and Canada. Its home is in high northern latitudes, to which it retires in summer to breed. Mudie says its nest has been found in the marshy country which lies along the coast of the Northern Ocean to the eastward of Cape Wrath, which would make it a native of Great Britain. It has been observed that in summer they go far off to sea, feeding on drifting seaweed. During its winter visits to our shores it frequents salt-water marshes and fens, being found generally along the coasts of England, Scotland, and Ireland, which are frequented by other species of wild geese, and abounding in the sandy and muddy flats between Holy Island and the coast of Northumberland and in Cromarty Bay. It feeds on drifting sea-weeds and saline plants, but never on fresh-water herbage. In the winter months, beginning with November and December, it affords amusement to our sportsmen, to whom it offers an easy game, as the instinct of the birds causes them, when alarmed, to crowd together. It is considered the finest and most delicate for the table of all the birds of the goose tribe. The London market is well supplied with it in winter.

BRESCIA (Latin, *Brixia*), a city of Lombardy, North Italy, 40 miles N. W. of Verona, and about the same distance N. E. of Lodi, on a beautiful plain on the banks of the rivers Mella and Garza. It is the capital of the province of the same name. It is a handsome and flourishing city, of a square form, about 4 miles in circuit, and surrounded by walls; its streets are spacious, and its public buildings numerous, particularly its churches, which are further remarkable for the number and value of the paintings with which they are enriched. A few of them only, however, have much pretension to architectural beauty; amongst those that have are the cathedral, a handsome structure of white marble, and the Church of San Domenico. But however plain in exterior appearance most of the Brescian churches may be, they are all richly decorated within with the most beautiful frescoes, and other creations of taste and art. The other buildings most worthy of notice are the Palazzo della Logia, and the Broletto. The first was intended for the palace of the municipality, or town-hall; it is composed of the richest marbles, and was worked upon by the first architects of the fifteenth and sixteenth centuries successively. The Broletto, the ancient palace of the republic, combines the characters of fortress and town-hall, and is surmounted by a great tower, whose deeply-cleft Italian battlements produce a singularly grand effect. The whole is in a colossal style, and marked by the peculiar characteristics of the age in which it rose—supposed to be about the end of the twelfth and beginning of the thirteenth centuries. The city contains also a lyceum, two gymnasia, an athenæum, a college, with a museum of antiquities, and a botanic garden; a public library, with 30,000 volumes; a theological seminary, a handsome theatre, a corn-exchange, an extensive hospital, and other educational and charitable establishments. There are seventy-two public fountains in the streets and squares, besides some hundreds of private ones. Outside the town is a cemetery, begun in 1815, designed by Vantini.

Brescia is a place of considerable trade and manufacturing industry. Near it are large iron-works, and its fire-arms are esteemed the best that are made in Italy. It has also silk, linen, and paper factories, tan-yards, and oil mills, and is an important market for raw silk. But it derives its greatest interest from its fine Roman remains, having been at one time the seat of a Roman colony. These first attracted attention in the seventeenth century; although, as far as regards inscriptions, they had been objects of especial care to the citizens of Brescia for two centuries before this period, but it was not till 1820 that any very earnest efforts were made to bring the buried remains of entire buildings to light. Since that period some remarkable discoveries have been made, embracing besides numerous statues and inscriptions the beautiful marble temple of Vespasian, and a number of noble and magnificent Corinthian columns, with numerous fragments of mouldings and ornaments, some gilt, and all of great elegance. Brescia was the seat of a school of painting of great merit, to which many eminent artists belonged, including Alessandro Bonvicino, commonly called 'Il Moretto,' who flourished in the sixteenth century, and was remarkable for the deep devotional feeling which he threw into his sacred subjects, as well as for his excellence as a portrait painter. The city is of great antiquity, having been

the chief town of the Cenomani, a Gallic tribe, who were conquered by the Romans. It became the seat of a Roman colony under Augustus about B.C. 15, and afterwards a municipium. In the year 412 it was burned by the Goths, and was soon afterwards destroyed by Attila; but was rebuilt about the year 452. It was taken by Charlemagne in 774. In 936 Otho I. of Saxony declared it a free city, and it so remained for nearly three centuries, taking an active part in the feuds of the Guelphs and Ghibellines, and ultimately put itself under the protection of Venice in 1426. In 1796 it was taken by the French, and was assigned to Austria by the general treaty signed at Vienna on June 9, 1815. In 1849 it was involved in the commotions by which so large a portion of continental Europe was disturbed in that year; its streets were barricaded, but the city was eventually carried at the point of the bayonet by the Austrians under General Haynau. It was ceded to Sardinia by the treaty of Zürich in 1859. Brescia is the see of a bishop, suffragan to the Archbishop of Milan. The cathedral of Brescia was begun in 1604, and completed in 1825. Pop. 38,906.

BRESLAU, the third city in the German Empire, and the second in the Prussian dominions, being excelled in population only by Berlin and Hamburg, is the capital of the province of Silesia. It is situated at the confluence of the Ohlau and the Oder, in a spacious plain bounded N. by the Trebnitz Mountains, and S., at a greater distance, by those of Zabtein. The Oder divides it into the old and new towns, which, with their suburbs, are connected by no fewer than 120 bridges. The streets of the old town are narrow, those of the new broad. The public squares and buildings are handsome. The fortifications have been converted into promenades, and the ditch into an ornamental sheet of water, its former means of defence being thus rendered one of the chief ornaments of the city. The cathedral, built in the twelfth century, and the Rathhaus, or town-hall, a Gothic structure of about the fourteenth century, are among the most remarkable examples of ancient architecture. The Catholic university has been combined with the Protestant one of Frankfort-on-the-Oder, transferred hither in 1811; and there are now two faculties of theology; one Catholic, the other Evangelical. The university has attached to it a museum of natural history, a cabinet of antiquities, a library of 300,000 volumes, an observatory, a picture-gallery, and a botanic garden. The number of students amounts to 900. There are numerous other educational institutions, as well as hospitals and asylums. Breslau carries on an extensive trade in the products and manufactures of Silesia, principally in corn, wool, metals, and timber. There are two annual wool fairs, which are largely attended. The pop. in 1871 was 208,025.

Breslau was the seat of a bishopric by the year 1000; an independent duchy from 1163 to 1335; was ceded to Austria after many wars and calamities in 1527. It was conquered by Frederick II. of Prussia in 1741. It was from this time the scene of frequent warfare, being alternately attacked by Austrians, French, Russians, and Prussians. It was twice occupied by the French, in 1806 and 1813. Its fortifications were destroyed in 1807, but it finally remained in the hands of Prussia.

BRESSAY, one of the Shetland Isles, E. of the Mainland, from which it is separated by Bressay Sound, about 6 miles long, and 2 to 3 in breadth; lat. 60° 10′ N.; lon. 1° 6′ W. Its line of coast is rocky and deeply excavated; the interior is hilly, and to a great extent covered with peat-moss. On the S. there are three bold headlands: the Ord, the Bard, and the Hammer. The first is 500 feet high, and inhabited by eagles. Sea-fishing is the principal occupation of the inhabitants. Kelp and hosiery are manufactured, and quarries of coarse slate are wrought. Bressay Sound is a safe harbour, about 1 mile to 1½ mile in breadth. Pop. in 1871, 878.

BREST (anciently *Brivates Portus* and *Gesobrivate*), a seaport in France, and principal place of a district in the department of Finisterre, in the former province of Brittany, 320 miles S. by W. from Paris; lon. 4° 29′ 10″ W.; lat. 48° 23′ N.; pop. 79,847. It has one of the best harbours in France, and a safe road, capable of containing 500 men-of-war in 8 10, and 15 fathoms at low water, and it is the chief station of the French marine. The coast on both sides is well fortified. The entrance is narrow and difficult, with covered rocks, that make it dangerous to those not well acquainted with it. The arsenal is an immense and superb building, and the dockyards are well constructed. Brest contains two parishes and a marine seminary. It is the seat of a governor, of an admiralty board, and a municipality. Brest, which in the middle ages was of so much importance that it was said, 'He is not Duke of Brittany who is not lord of Brest,' had sunk by the beginning of the reign of Louis XIII. to little more than a village. Richelieu resolved to make it the seat of a vast naval arsenal. An ordinance of 1631 gave Brest the precedence, as a port, of Havre and Rouage; but little was done till the beginning of the reign of Louis XIV., when Duquesne came to superintend the works. He remained there seven years, and made it a port. Vauban followed him, and fortified it. The importance of Brest soon attracted to it the attention of the English, who frequently attacked it during their wars with France. In 1694 the combined fleets of England and Holland disembarked a force which attempted to take Brest, but was repulsed with great loss. June 1, 1794, the French fleet was beaten off Brest by the British, under Howe, who took from them six ships of the line, and sunk a seventh. The manufacturing industry of Brest is inconsiderable, but its commerce is extensive. Its chief exports are cereals; its principal imports colonial produce and naval stores. The arsenal employs 8000 to 9000 men.

BRETAGNE. See BRITTANY.

BRETEUIL, LOUIS AUGUSTE LE TONNELIER, BARON DE, a French diplomatist, was born in 1733; died at Paris in 1807. He was at first minister-plenipotentiary at the court of the Elector of Cologne, afterwards at the Russian court, then successively ambassador in Sweden, Holland, Naples, at Vienna, and the congress at Teschen. His embassy to Vienna explains his attachment to the Queen Marie Antoinette. As minister and secretary of state he was a zealous defender of the monarchy; he was therefore considered as one of the greatest enemies of the revolution. After the capture of the Bastille (14th July), he escaped the fate of Foulon, who was massacred by the insurgents on the 22d, by a hasty flight. In 1790 Louis XVI. intrusted him with several secret negotiations at the principal northern courts. The Convention issued a decree against him. In Bertrand de Moleville's History of the Revolution there is valuable information with respect to his last diplomatic labours. In 1802 he returned, with the permission of the government, to France.

BRÉTIGNY, a village of France, in the department of Eure-et-Loire, 6 miles S.E. of Chartres, on the Paris and Orleans Railway. By the treaty of Brétigny, concluded on the 8th of May, 1360, between Edward III. of England and John II. of France, the latter, who had been taken prisoner at the battle of Poitiers, recovered his liberty on a ransom of 3,000,000 crowns, to be paid in six years.

Edward renounced his claim to the crown of France, and relinquished a portion of his conquests and possessions in that country, including Anjou and Maine, and the greater part of Normandy; receiving the cession in independent sovereignty of the duchy of Aquitaine, with all its dependencies; Gascony, Poitou, Saintonge, Aunis, Agenois, Périgord, Limousin, Quercy, Rouergue, Angoumois, together with Calais, the counties of Ponthieu and Guines, and the viscounty of Montreuil.

BRETSCHNEIDER, Heinrich Gottfried von, was born at Gera 6th May, 1739; died 1st Nov. 1810. He was educated at the institute of Herrnhuters at Ebersdorf, entered the army as a cornet in the regiment of Count Brühl, was present at the battle of Kolin, and afterwards became captain of a Prussian free-corps, and was made prisoner by the French. During his forced stay in France he acquainted himself with the language, and with the spirit of the people. On his return he was appointed governor of Usingen in Nassau. This government being shortly suppressed, he travelled in England and France, and became associated with Count Vergennes, who employed him in diplomatic missions. He returned to Germany in 1772, and was shortly afterwards engaged in the service of Austria, where he was first named vice-governor of the banat of Temesvar. This banat having been incorporated in Hungary in 1778, he obtained the appointment of librarian to the University of Buda. Here his hostility to the monks, and especially to the Jesuits, led him into trouble; although the Emperor Joseph II., who held the same views, declared himself his protector. He was obliged to retire from Buda, and was appointed librarian at Lemberg, and also counsellor to the government. In 1809 he retired with the title of aulic counsellor. His views were liberal and somewhat sceptical, which, with his active opposition to the monastic orders, gained him many enemies. His principal works are: Reise nach London und Paris, &c., 1817; Almanach der Heiligen auf 1788; Waller's Leben und Sitten, &c. (1793).

BRETT, Richard, theologian, born 1561; died 1637. He was rector of Quainton in Berks, and assisted in the translation of the Bible under James I.

BREUGHEL, the name of a celebrated Dutch family of painters, the first of whom adopted this name from a village not far from Breda. This was Pieter Breughel, also called, from the character and subject of most of his representations, the Droll or the Peasants' Breughel. He was born in 1510 (according to Mechel, in 1530), was a pupil of Peter Koeck van Aelst, travelled into Italy and France copying the beauties of nature, and after his return fixed his residence at Antwerp, where he was received into the Academy of Painters in that place. He subsequently married the daughter of his instructor Koeck, and removed to Brussels, where he died in 1570 (according to some in 1590). In his rural weddings, his rustic feasts and dances, he strikingly represents the gaiety of the villagers, as he himself had frequently observed them, in disguise, in his youth. He also etched, but many of his pictures have been engraved by others. He left two sons—Pieter and Jan. The former (called the Younger Breughel), preferring subjects affording striking contrasts, painted many scenes in which devils, witches, or robbers are the principal figures. This particular turn of genius procured him the name of Hell Breughel. Among his pieces are Orpheus playing on his Lyre before the Infernal Deities; also, the Temptation of St. Anthony. The former picture hangs in the gallery of Florence. The second brother, Jan, was distinguished by his landscapes and small figures. From his usual dress he received the title of Velvet Breughel. He also painted for other masters landscapes as back-grounds to their pieces, and sometimes little figures in them. He was a very prolific artist. In connection with Rubens he represented Adam and Eve in Paradise. The figures in this picture are painted by Rubens. This piece, his Four Elements, also Vertumnus and Pomona, which were all executed jointly with Rubens, are among his principal performances. He is said to have been born in 1568; other authorities say 1569, 1575, or 1589. He visited Italy, and enriched his imagination with beautiful scenery. He is said to have died in 1642, or by other authorities 1625. Other members of this family, belonging to a later period, are Ambrose, who was director of the Antwerp Academy of Painting between 1635 and 1670; and Abraham, who for a time resided in Italy, and died in 1690; the brother of the latter, John Baptist, who died in Rome; and Abraham's son, Caspar Breughel, known as a painter of flowers and fruits.

BREVE, a note of the third degree of length, and formerly of a square figure, as ; but now made of an oval shape, with a line perpendicular to the stave on each of its sides: . The breve, in its simple state, that is, without a dot after it, is equal in duration to one quarter of a large, or to two semibreves, and is then called *imperfect;* but, when dotted, it is equal to three-eighths of a large, or to three semibreves, which being the greatest length it can assume, it is then called *perfect.* It is now chiefly used at the close of passages or compositions.

BREVET, a term borrowed from the French, in which it signifies a royal act granting some favour or privilege, as *brevet d'invention.* It is applied in Britain and America to nominal rank in the army higher than that for which pay is received. Thus a brevet-major serves as captain, and draws pay as such.

BREVIARY (from the Latin *breviarium*), a summary or abridgment of prayers. The breviary is the book containing the daily offices which all who are in the orders of the Church of Rome, or enjoy any Catholic benefice, are obliged to read. It is an abridgment of similar offices previously in use. The breviary contains prayers or offices to be used at the seven canonical hours of matins, prime, tierce, sext, nones, vespers, and compline. It is not known at what time the use of the breviary was first enjoined. St. Basil, St. Jerome, and St. Ambrose speak of the seven hours called canonical. The services in use in the convents and monasteries in the early ages were very exhaustive from their great length. A council held at Tours in 567 enjoined that matins and vespers should never have less than twelve psalms each, and that the former should have thirty in Lent. It was under Pope Gregory VII. (1073–85) that the abridgment of the offices began to be considered necessary. In 1241 a breviary revised by Haymon obtained the approbation of Gregory IX., and was introduced in all the churches of Rome under Nicholas III. In 1568 Pius V. published a breviary which has remained, with few modifications, to the present day. The Roman breviary, however, was never fully accepted by the Gallican Church, which persisted in maintaining its own offices. The Ultramontane party there had long struggled in vain for the introduction of the Roman breviary, but from 1840 to 1864, by a final and vigorous effort, the opposition of the Gallican party was overcome, and the uniformity of usage generally established, the u.. to the dissatisfaction of a large number of French Catholics.

The Psalms occupy a large place in the breviary, the order of the reading being so arranged that in general a hundred psalms shall be recited in a week.

Passages from the Old and New Testament and from the fathers have the next place. All the services are in Latin, and their arrangement, which is adapted to the various seasons and festivals of the church, is very complex. The English Book of Common Prayer is based on the Roman breviary.

BREVIPENNES, a sub-division, according to several naturalists, of one of the orders of birds, but occupying a different position in different systems. Cuvier makes it a family of the order Grallæ or waders. It includes two genera, the ostrich and the cassowary. The Dodo and Apteryx are also referred to it, but not without question. The Brevipennes have a resemblance in several of their distinctive characteristics to the Gallinaceæ. Their pectoral muscles are reduced to extreme tenuity, and the sternum has no ridge, while the muscles of the thighs are of great strength and thickness. They are thus fitted for walking or running, rather than for flying. As their name implies their wings are short. The Brevipennes are also characterized by a peculiar mode of incubation. Several females lay in the same nest, and the eggs are sat upon by the male, from which it is inferred that they are polygamous.

BREWING. The juices of fruits contain sugar, which is essential to the vinous fermentation. But this does not exist in any important quantity in seeds. Instead of it, however, we have starch, and this may combine with water so as to form sugar. This combination is performed very perfectly by a vital process; that is to say, it takes place only in a living seed, and not in one which is frozen, burned, or otherwise killed. It is known by the name of *germination* or *growing*, and is of familiar occurrence, being what takes place in every seed that is successfully planted. The seeds of wheat, rye, barley, &c., consist principally of starch. If a grain of these is examined we find near one end of it a small body, which is the rudiment of the future plant, and the microscope shows us that this consists of two parts—the *plumula*, which is destined to ascend through the earth to form the stalk, and the *radicle*, which is to be spread abroad below, and form the root. Whenever a grain of barley, oats, or certain other of the gramineous seeds is exposed to water, it begins to swell and absorb the moisture; and at the same time, if the temperature of the air is not too cold, the radicle thrusts itself out at the lower end; the plumula, on the other hand, pushes itself along beneath the husk of the grain to the other end before it thrusts itself out. There are several curious considerations in regard to this process. The one which concerns us at present is this, that as the plumula is passing along through the husk, the part of the seed along which it passes becomes changed into the substance known in chemistry by the name of *starch sugar;* that is, when the plumula has passed along one-third of the length of the grain, that third is starch sugar, while the remaining two-thirds are still starch; and so with the rest. The starch sugar seems to be some combination of starch and water. The final cause of the change is undoubtedly the support of the growing plant, sugar being evidently necessary to the growth of plants, as it is always found in their sap, and sometimes, as in the sugar maple, in great quantities. The moment, however, the plumula begins to protrude beyond the end of the grain the sugar diminishes, as it is consumed by the young stalk; and the substance of the seed is also consumed, though by no means to the same extent, by the growth of the root. To produce this change in seeds, and thereby to fit them for yielding a sweet fluid, when mixed with water, is the business of the maltster; and it is an operation of great delicacy, upon the successful performance of which the success of a manufactory of ale or beer in a great measure depends.

The first operation in malting is to plunge the barley or other grain to be malted into a large cistern containing water enough to cover the whole mass. The barley immediately separates into two parts; one is heavy, and remains at the bottom of the water, while the lighter portion, consisting of chaff, defective grains, &c., floats on the top. This latter is skimmed off as of no use. The heavier part, or sound barley, is suffered to remain till it has absorbed a portion of the water sufficient for the purpose of enabling it to germinate. This is *steeping*. It is the first process, and usually occupies about two days. When the grain is sufficiently steeped the water is let off, and the grain thrown out of the cistern and piled in a heap, or, as it is technically called, a *couch*. After a few hours the bottom and inner part of the heap begin to grow warm, and the radicle or root to make its appearance; and the germination thus commenced would go on rapidly but for the labour of the maltster, who, with a view of making all the grains grow alike, checks the growth of such as are in the middle of the heap by turning them to the outside, and *vice versâ*. For this reason malting cannot be performed with any success in summer, which would at first sight seem to be the fittest season. On the contrary, the best maltsters prefer the coldest weather; for, at this season, they can always keep the germination going on at the rate they wish by heaping up the grain; whereas, in warm weather it grows so rapidly that no effort can make the process equal and regular. Thus the grain is turned backwards and forwards for fourteen days, at the end of which period the *acrospire*, as it is called, or the plumula, having nearly reached the end of the grain, and the latter having acquired a sweet taste, the process of growth is suddenly and effectually stopped by spreading the whole upon a kiln, which is a floor of iron or tiles, perforated with small holes, and having a fire beneath it. There the life of the grain is destroyed, and it is thoroughly dried.

The malt thus made is ground, or rather crushed, by passing it between a pair of iron rollers. It is then prepared for brewing. The first step in brewing is called *mashing*. It consists in stirring up the malt with a quantity of hot water, which dissolves the starch sugar of the malt, and forms a sweet liquor called *wort*, similar to the must, or sweet juice of the grape, from which wine is made. The manufacture differs, however, in some essential particulars, at this stage of the process, from that of wine; for if the wort were allowed, as the must is, to ferment without obstruction, it contains so much of the mucilage and starch of the grain, that it would run into the acetous, and from thence into the putrefactive fermentation, and would be *foxed*, as it is technically termed; that is, it would become ill-smelling vinegar instead of beer. To prevent this, it is first boiled. This process renders it stronger, by evaporating a portion of the water; and, further, it coagulates or curdles the mucilage, which subsides afterwards, and is not again dissolved, thus separating an injurious ingredient. While boiling, a portion of hops is added. One object of this is to give an aromatic, bitter taste to the liquor, which habit has rendered agreeable. The principal object of adding the hops, however, is, to check the tendency to the acetous fermentation, which is always far greater in liquor so compound in its character as beer, than in the simpler liquors, as wine and cider.

After the worts are sufficiently boiled, they are poured out into large shallow cisterns or coolers, till

they become cool, and deposit much of the curdled mucilage. They are then allowed to run into a deep tub or vat to ferment. If left to themselves, however, the process would take place very imperfectly, and it is therefore assisted by the addition of yeast, which excites fermentation in the wort, by means of which a portion of the saccharine matter contained in the liquor is converted into alcohol. The fermentation continues for a period of time longer or shorter, according to the fancy of the brewer, and is then checked by drawing off the liquor into barrels or hogsheads. In these the fermentation still goes on, but it is now called by brewers *cleansing*. With a view to take advantage of this process, the casks are placed with their bung-holes open, and inclined a little to one side. The scum, as it rises, works out at the bung, and runs over the side, and thus the beer is cleansed from a quantity of mucilage, starch, and other unfermented matters. What does not run out at the bung subsides to the bottom, and constitutes the *lees*. After this cleansing is completed, the clear beer is racked off into barrels, and preserved for use. The scum and lees are collected, and the former constitutes the yeast for the next brewing.

Such is the general history of brewing, whether the product is to be beer, ale, or porter. Even this racking, however, does not remove all the unfermented matter. Some starch and gluten still remain; of course, the liquor soon begins to ferment again in the barrels; but, as these are closely stopped, the carbonic acid gas, or fixed air, cannot escape, but becomes mingled with the beer. Every successive fermentation causes some lees, from which the beer may be racked off, and, by repeated racking, the fermentative matter may be completely removed, and such beers become clear, transparent, and somewhat like the German wines, as, for instance, that commonly called *hock*. But the disposition to ferment being thus entirely destroyed, they are, like these wines, perfectly still, and acquire no disposition to froth by being bottled. Hence old sound beers may remain in bottles for years without *coming up*, as it is technically called. The object of the brewer is to produce an agreeable beverage, distinguished not so much for absolute strength, or quantity of alcohol, as for colour, flavour, transparency, liveliness, and power of keeping well. Some of these qualities are not compatible with the development of the greatest quantity of alcohol or ardent spirit, which is the main object of the whisky-distiller. To effect this purpose, he makes a kind of beer which is called *wash*. This differs from brewers' beer in some important particulars. In the first place, the grain is not all malted: in Britain, only a part of it is so; in the United States, generally, not at all. In the next place, it is ground a great deal finer than in brewing. If the brewer were to grind his grist as fine as the distiller, he would run great risk of *setting his mash*, as the phrase is; that is, he would make paste of his grain, and entangle the solution of sugar so effectually, that he could not get it out again. The distiller does not run the same risk, because he does not use such hot water as the brewer, and he can mash and stir his *goods* a great deal longer without injury, and even with benefit to his liquor. Again, he does not need to boil or add hops to his worts, for he does not care about precipitating the mucilage, or making his beer keep. In the next place, he adds a great deal of yeast, and ferments violently and rapidly, so as to decompose the sugar as quickly as possible, and is quite indifferent whether the worts even become somewhat sourish in the process, as, when sufficiently fermented, the alcohol is removed at once by distillation. If raw grain be ground, mixed with water at a certain heat, and allowed to stand, the change of the starch into starch sugar, or the combination of starch and water, takes place in the same way as in malting. It takes some time, however, and hence the distillers' mashes stand longer than the brewers'. It would seem, therefore, from this, that the malting of grain is not necessary for the making of beer; and, accordingly, this method of proceeding has been recommended by an eminent chemist, one who has paid much attention to this subject, and there can be no doubt that a certain description of small beer may be so made. But the process is not applicable to the finer and more valuable kinds of malt liquors, for reasons which it would require too many details to explain perfectly.

Besides the kinds of beer already mentioned, there are others in common use. These are made by mixing honey, molasses, or sugar with water, and fermenting with yeast, or some other leaven. Beers made in this way are commonly mingled with some vegetable substance, as ginger, spruce, sarsaparilla, &c., to give them a particular flavour, and are familiar to all by the names of *ginger-beer*, *spruce-beer*, &c. &c. Of the beers manufactured from grain, as an article of consumption in that state, there are a great many varieties. These, however, may be all comprehended under three principal ones—*beer*, *ale*, and *porter*, although, as we have already mentioned in the article ALE AND BEER, the two former terms are somewhat loosely applied. Beer differs from the other two in the circumstance of its being made for immediate consumption. There are two or three kinds of ordinary beer, known by the names of *strong-beer*, *table-beer*, *half-and-half*, &c. These differ only in their relative strength, being all brewed upon the same general principle, and adapted to be used soon after they are made. It is of no consequence, so far as regards the principle of brewing beer, whether the malt of which it is made be of one colour or another: it may be pale, or high-dried, or amber, or anything else. In some places, indeed, where the beer is to be sent out very weak, it does not go into the fermenting tun at all, but the yeast is mingled with the worts in the small casks, and it is sent out at once in full fermentation, and drunk up, in fact, before this has time to subside entirely. Ordinarily, however, it is fermented a little in the tun, and then cleansed and racked in a very short time. When beer is sent out in this state, it is always necessary to mingle with it a quantity of what are called *finings*, that is to say, isinglass, or something of the sort, which causes the dregs to subside to the bottom. Beer made in this way is an agreeable liquor, and well adapted to the purposes of draught in cold weather.

The other chief varieties of malt liquor are ale and porter. These are not intended for immediate consumption, but to be kept for a longer and shorter period. Ale is a sweeter liquor than porter, and generally stronger. The first part of the process, on which the difference in the liquors depends, is the drying of the malt: for ale it must be dried very carefully and slowly, so as to be of a pale colour; and the article is inferior if any of the grains are scorched or burned, so as to communicate a harsh taste to the liquor. In the next place, the heat of the water, when poured on the grain or mash, must be higher. The reason given for this is, that it renders the worts clearer when they are drawn off from the mash-tun. It is not clear why this is of any consequence, for it would seem that the boiling, to which the worts are afterwards subjected, would be sufficient to curdle and precipitate any mucilage dissolved during the mashing. Such, however, is not the case; and a low heat in mashing is always apt to be followed by violent fermentation, very difficult to check, and very apt to produce acidity. The higher the heat of the

mashing-water the better, provided it is not so high as to set or make paste of the mash. The exact point can be determined only by experiment, and must vary with the comparative softness of the water and comparative paleness of the malt. In the next place, the mashing or stirring must not be long continued, as it is only desirable to dissolve the sugar; and the effect of long mashing is to mix the starch and mucilage with the worts, and, of course, to diminish their comparative sweetness. For the same reason, the first mash only is proper for fine ales, as the last always contains much more starch and mucilage. These ales thus acquire a sweetness which cannot be removed, except by very long fermentation, and therefore they long continue more generally palatable than porter.—The fermentation of ales is conducted very differently from that of beer. They are let down, or put into the fermenting tun, at a lower temperature, and the fermentation is made to go on slowly and gradually. They are then drawn off clear, and cleansed, till the yeast is as much as possible removed. Hence these liquors, when well made, require no finings, but are racked off so clear that they become fine of themselves, and much higher flavoured than they can possibly be when finings are used. Lastly, ale can only be had in perfection from bottles. Its sweetness, high flavour, and effervescing quality cannot long be preserved on draught, any more than the fine qualities of champagne.

Porter, the favourite drink of Londoners, to be perfect, in the first place, requires a large proportion of brown or high-dried malt—that is, malt which has been scorched on the kiln; but it is rarely, or rather never, made so at the present day. It is a wasteful and expensive practice to dry malt in this way, as its valuable constituents are very much wasted by this high-drying, which operates, in fact, like distillation, carrying off in the steam what ought to be left behind. Only a small portion of such malt is therefore now used, and sometimes very little indeed, the colour of porter being produced artificially by means of burned sugar. Low heats are used in the mashing, for the liquor is not to be sweet, and it is therefore most profitable to get as much starch as possible. For the same reason the products of all the mashings are mingled together, thus constituting entire porter. Formerly it was the practice in London to take the separate mashes, for porter, of three different qualities, which were mixed by the retailer, to form porter *of three threads;* but afterwards the brewers, disliking this practice, made the porter *entire* at once. It is obvious that ale could not be made entire. Again, porter is fermented with more rapidity than ale, and hence it requires very careful watching, lest it suddenly pass the bounds of the vinous, and run into the acetous fermentation. It requires to be cleansed off sometimes at a moment's warning, or else it gets that acidity which is its most common fault. After all it abounds in unfermented matter, and requires a length of time to ripen—that is, to change this matter into alcohol; and this it does best in large masses. Whether from this reason, or some other that does not appear, it seems to be pretty generally admitted that scarcely any brewery, either in England or elsewhere, has been able to make porter equal to the large porter-breweries of London. Dublin comes next in reputation to London for the quality of its porter. The brewing of several other places, however, is rapidly rising in reputation. The superiority of the London porter has been attributed to the use of the Thames water; but, in the first place, the small London breweries, which do not make good porter, have this advantage in common with the larger ones; and, secondly, these last have long since ceased to use the water of the river, as it contains too much vegetable matter, and is liable to cause acidity in the liquor. The superiority, as far as it exists, is doubtless owing to command of capital, and consequent power of choice in the malt-market, and system in conducting the business: moreover, a wealthy concern like a London brewing company has always means of persuading bottlers and retailers of all descriptions that it is for their advantage to sell and praise their porter in preference to that of a small establishment, whose liquor may be equally good, but not quite so cheap. Ales are frequently coloured by the addition of brown malt or burned sugar. This is to suit the taste of consumers who associate the idea of strength and body with high colour. It is impossible that ales thus coloured should be without a harsh taste, which is a defect. Ales, to be perfect, must be pale, and the fine English ales always are so.

A variety of beer which has come into extensive use in recent years is that known as *bitter-beer*, or *East India pale ale*. This sort of beer is made from worts extracted from pale malt and boiled with the palest hops; and great care is taken in the selection of these materials, and in the whole process of brewing, when a high-class pale ale is intended to be produced. The bitter-beer made for home consumption is less bitter and more spirituous than that which is sent abroad—at least as brewed by the best brewers; but a good part of the beer sold under this name is 'merely a superior kind of table-beer which has been boiled with twice or thrice the quantity of hops used for ordinary ale, part of the hops being not unfrequently replaced by less expensive bitter drugs.' The finest pale ale is that manufactured in the great Burton breweries. The excellence of the Burton ale depends partly on the water used, which is all drawn from wells, and contains carbonates and sulphates of lime and magnesia in large quantities, and partly on the method of brewing, the fermentation being carried on at a low temperature, and the delicate flavour of the hops thus preserved, and the keeping quality of the beer secured.

Brewing may be practised on a small scale with perfect success. The following apparatus for domestic brewing would not cost above £1 or £2. Procure a common porter barrel; take out one end and convert it into a false bottom by letting it rest on a hoop nailed round the lower part of the barrel within 3 inches of the real bottom. Perforate this false bottom with a vast number of gimlet-holes. Between the real and false bottom fix a cock in one of the staves of the barrel. This is the mash-tun. Another porter barrel, with one end taken out, will be a convenient fermenting tun, and it may be placed beneath the cock of the mash-tun so as to receive the wort when it is drawn off. In this position it serves also as the under-back. A tin-plate boiler may be procured, in the bottom of which is a cock, and the insertion of the cock may be covered over within the boiler with a tin-plate colander which will permit the boiled wort to strain off, but will detain the hops. This boiler may fit on a common fire-grate. It will answer also for heating the mash liquors. A thermometer may be used, but it may be dispensed with, and the proper heats determined by mere measurement of cold or boiling water. Fifteen gallons of boiling water are to be thrown into the mash-tun, and five of cold water (60°). The temperature of this mixed water would be 174°, but for the cooling influence of the wooden vessel, which, however, should be well scalded just before being used. The mash water will prove to be about 170°. Two bushels and a half of the best ground pale malt are now to be quickly shaken in, while a second person continually blends the malt and water with a stick.

The agitation is to be continued for half an hour, the barrel being kept covered with some folds of thick linen cloth, which will readily permit the agitation of the stick. After an hour's repose the cock may be opened, very little at first, but more by degrees. The wort runs bright and clear, and the original 20 gallons come off less by the suckage, which amounts to so much as 17 gallons. Just when the last portions have run off, water, not quite boiling, is to be lightly let over the residual grains to the amount of 20 gallons, and allowed to percolate through so as to wash down the wort which had been retained. The total amount of wort obtained may now be about 23 gallons. The wort is then to be boiled with about 3¼ lbs. of best mild hops for twenty minutes; after which it is to be drained off into the fermenting-tun, and when it has cooled nearly to blood heat (98°), about a quart of good yeast is to be mixed in, and the fermentation is to be continued until completed. In cold weather the tun, while working, must be kept in an aired apartment, or near the fire, as on this small scale it does not maintain its original temperature, and unless this is done the attenuation will not be by any means sufficient. When the fermentation shows a decided tendency to go down, although a moderate warmth has been kept up, the liquor is to be racked off from the fæces, and put into a cask. The ale will measure 20 gallons. It should be closely bunged up; and it will be excellent in about a month.

BREWSTER, Sir David, one of our most learned natural philosophers, was born at Jedburgh, Dec. 11, 1781. He was originally intended for the church, and with that view entered the University of Edinburgh, where, however, the lectures of Robison and Playfair attracted him to scientific pursuits. His first investigations were on the subject of the polarization of light, upon which he communicated some important observations to the Transactions of the Royal Society of Edinburgh. In 1808 he became editor of the Edinburgh Encyclopedia, to which he contributed a number of valuable articles. In 1816, while repeating the experiments of Biot on the action of fluids on light, he made those observations which resulted in the invention of the kaleidoscope. In 1819, in conjunction with Jameson, he founded the Edinburgh Philosophical Journal, of which he was sole editor from 1824–32. Brewster was one of the leaders among those men of science who founded the British Association, the first meeting of which was held at York in 1831, and he presided over it on the occasion of its twentieth meeting, which was held at Edinburgh in 1850. In 1832 he received the honour of knighthood along with a pension from the government. Both before and after this time his services to science obtained from many quarters the most honourable recognition. The French Institute, of which he had been a corresponding member since 1825, appointed him one of its eight foreign associates on the 4th of Jan. 1849, and he was also among the members of the Academies of St. Petersburg, Berlin, Vienna, Stockholm, and Copenhagen. From Prussia he received the Order of Merit in 1847, and in 1855 the cross of an officer of the Legion of Honour was bestowed on him by Napoleon III. From 1838 to 1859 he was principal of the united colleges of St. Leonard's and St. Salvador at St. Andrews, and in the latter year he was unanimously chosen principal of the University of Edinburgh—an office which he continued to hold till his death, which took place at his seat of Allerly, near Melrose, Feb. 10, 1868. The chief works of Brewster are, a Treatise on the Kaleidoscope; Letters and Life of Euler; Letters on Natural Magic, dedicated to Sir Walter Scott; Treatise on Optics; Martyrs of Science; More Worlds than One; Memoirs of the Life, Writings, and Discoveries of Sir Isaac Newton (Edin. 1855); an enlarged edition of his Life of Newton, which originally appeared as the twenty-fourth volume of Murray's Family Library; besides numerous communications to the Royal Societies of London and Edinburgh, contributions to the Encyclopedia Britannica, the Edinburgh and North British Reviews, and other periodicals.

BRIAN (surnamed *Boroimhé* or *Boru*) figures in early Irish annals as a celebrated chieftain, and son of Kennedy, king of Munster. He succeeded to both Munsters, nearly identical with counties Tipperary and Clare, in 978. Having defeated the Danes of Limerick and Waterford, he turned his arms against O'Maclachaghlin, or Malachi, who had a nominal supremacy over the whole island, and became king in his stead, levying tribute, or *boroimhé*, from which circumstance he derived his surname from the rulers of all the different provinces. He distinguished himself as much in peace as in war, contributed greatly to the progress of civilization, and made many internal improvements. He fell in 1014, after gaining a signal victory over the Danes, who had leagued with a revolted chief called Maelmora.

BRIANÇON (*Brigentium*), a town, France, in the department of Hautes Alpes, on the right bank of the Durance, 35 miles N.E. from Gap, and near the Italian frontier. It is a fortress of the first class, occupying an eminence at the foot of the Col de Genèvre, 4284 feet above sea-level, and has sometimes been called the Gibraltar of the Alps, forming a central point from which troops can be marched to all their most important passes. Briançon is a town of great antiquity. According to Pliny it was founded by the Greeks. Pop. 3579.

BRIANSK, a town, Russia, government of, and 70 miles W.N.W. from Orel, on the right bank of the Desna. It is surrounded with an earthen rampart, contains sixteen churches, a monastery, with a seminary, and two poorhouses; and has a considerable trade in grain, hemp, hemp-oil (sent to St. Petersburg and Riga), honey, and wax; and in linen, cables, and cordage, ironware, bark, mats, lime, and tar, which are sent to Kherson, Odessa, and other parts of the Black Sea. It contains imperial building-yards, for which the oak forests in the neighbourhood supply material. Near it are a cannon-foundry and a manufactory of small arms. Pop. 13,881.

BRIAREUS (also called *Ægæon*), a giant with 100 arms and fifty heads, the son of Uranus and Terra (Gaea). His two brothers, Cottus and Gyges, were formed in a similiar manner, and their formidable appearance struck their father with such terror, that he imprisoned them at their birth in the bowels of the earth (Hes. Theog. 147). In the war with the Titans Jupiter (Zeus) set them free, and by their assistance gained the victory. When Juno, Neptune, and Minerva conspired to bind the sovereign of the gods, Thetis brought Briareus from the depths of the sea (how he came there is not known) to the relief of the trembling Jove (Il. *a*. 402). Virgil places Briareus in the vestibule of hell (Æn. vi. 287). He was employed with his hundred-handed brothers (*Centimani*) in watching the Titans in Tartarus (Hes. Theog. 734). Various other fables are told of these gods, who are supposed to be personifications of the extraordinary phenomena of nature manifested in volcanoes, earthquakes, and other commotions.

BRIBE, a reward given to a public officer or functionary, to induce him to violate his official duty for the benefit or in compliance with the wishes of the party by whom or on whose behalf the bribe is given or promised. The term *bribery* is applicable alike both to the receiving and to the giving of the reward. A corrupt bargain for the votes of electors in the choice

of persons to places of trust under the government is bribery. In this instance the electors, as such, are a kind of public functionaries. To prevent the practice of bribery and intimidation at elections an act was passed in 1872 (35 and 36 Vict. cap. 33) providing that the votes, both at parliamentary and municipal elections, should be taken by ballot. The act, unless renewed, remains in force only till Dec. 31, 1880. An act directly against bribery at elections (31 and 32 Vict. cap. 125) was passed in 1868. Particular species of bribery are expressly forbidden, with penalties, by the positive laws of every state that is governed according to a written code. The corrupt discharge of a public trust, in consideration of bribery, is punishable at the common law, though not prohibited by any positive statute. A clerk to the agent for French prisoners in England was indicted and punished for taking bribes given for the purpose of inducing him to procure them to be exchanged out of their regular turn. An attempt to influence jurymen in giving their verdict by rewards is a species of bribery denominated *embracery*. Even *offering* a reward to a revenue officer to induce him to violate his duty, though the reward was not received, has been held to be an indictable offence. The same was held of a promise of money to a member of a corporation to induce him to vote for a mayor. The British laws and those of America specially prohibit bribery of the officers of the revenue; and the forfeiture, on the part of the offender offering the bribe, in Britain is £500; the officer receiving the bribe incurs the like forfeiture, and is disqualified for public employment, civil or military. Under the American laws, the party offering or receiving a bribe, in such case, incurs a pecuniary penalty, and becomes disqualified for any place of trust under the government. The laws of many of the United States contain special provisions against bribery of judges or jurymen, or of electors in the choice of public officers.

BRICK is a sort of artificial stone, made principally of argillaceous earth, formed in moulds, dried in the sun, and baked by burning. The use of unburned bricks is of great antiquity. They are found in the Roman and Grecian monuments, and even in the ruins of Egypt and Babylon. They were dried in the sun instead of being burned, and mixed with chopped straw to give them tenacity. On account of the extreme heat and dryness of the climate they acquired in some eastern countries a great hardness, and have lasted for several thousand years, but they are unsuitable for more northern latitudes. Burned bricks were also used at a very early period. They are mentioned in the book of Genesis in connection with the building of the Tower of Babel. The Greeks brought brick-making to great perfection. The most common bricks among the Romans were 17 inches long and 11 broad, and in later periods they were burned. Modern bricks are generally about twice as long as they are broad, and twice as broad as they are thick; their length is ordinarily about 10 inches. The best are made of a mixture of argillaceous earth and sand. Their red colour is owing to the presence of oxide of iron, which is turned red by burning.

The best season for making them is spring or autumn, since the process of drying then takes place more gradually and equably. The clay should be dug in autumn, and exposed to the influence of frost and rain. It should be worked over repeatedly with the spade, and not made into bricks until the ensuing spring, previously to which it should be well tempered by treading it with oxen, or by a horse mill, till it is reduced to a ductile and homogeneous paste. The clay may have too great or too small a proportion of argillaceous earth or of sand to form a paste of proper consistency; it will then be necessary to add the one or the other, as the case may be. When the mass has thus been thoroughly mixed, the moulder throws it into the mould, presses it down till it fills all the cavity, and removes the overplus with a stick. The bricks are then arranged on *hacks* to dry, disposed diagonally, to allow a free passage to the air. In about nine or ten days they are ready for the burning, for which purpose they are formed into *clamps* or *kilns*, having flues or cavities at the bottom for the insertion of the fuel, and interstices between them for the fire and hot air to penetrate. A fire is kindled in these cavities, and gradually increased for the first twelve hours, after which it is kept at a uniform height for several days and nights, till the bricks are sufficiently burned. Much care is necessary in regulating the fire, since too much heat vitrifies the bricks, and too little leaves them soft and friable.

Bricks are now largely made by machines, a number of which, differing in construction, are in use. The clay, according to one process, is mixed and comminuted in a cylindrical pug-mill, as it is called, by means of rotatory knives or cutters working spirally, and pressing the clay down to the bottom of the cylinder, where it is discharged in a tempered state. Machines are also used for moulding the bricks, and for making perforated bricks and hollow bricks, which are used when great lightness is required. Machine-made bricks are heavier, being less porous, than hand-made bricks, and are more liable to crack in drying; but they are smoother, and, when carefully dried, stronger than the hand-made.

Floating-bricks are so called on account of their property of swimming on the water. They are made of agaric mineral or fossil farina, which is found in some parts of Europe. Their infusibility at the highest temperatures renders them useful in constructing reverberatory furnaces, pyrometers, and magazines of combustible materials. Their lightness and non-conducting property render them particularly useful for the construction of powder-magazines on board of ships.

Fire-bricks, for building furnaces, &c., are made of a clay which, when properly prepared, is capable of resisting great heat. They are baked at an intense heat. The clay of which they are made contains more silica in combination with alumina than common brick clay.

Until 1850 there was a duty on the manufacture of bricks in this country. It is now free.

BRIDAINE, Jacques, a French preacher, born at Chuslan, in the diocese of Uzès, in 1701; died in 1767. He studied first in the Jesuit college at Avignon, and afterwards in the seminary of the congregation of royal missions in the same town. His talents would have permitted him to aspire to ecclesiastical dignity, but he resolved to consecrate himself entirely to preaching, which his extraordinary gift of natural eloquence enabled him to do with remarkable success. He travelled over the greater part of the s. of France in his preaching tours, and before he died had completed his 256th mission. His eloquence was spontaneous, vehement, and imaginative; his voice so sonorous that he could be heard by 10,000 persons at once. He improvised his discourses from the simplest texts; but he made use of many accessory means, some of them vulgar, for attracting attention. He had so systematized these devices that he could use them at will with an appearance of sudden inspiration. This, together with his eloquence, caused his ministry to be attended with many of those exciting scenes associated with what is commonly called a religious revival. Massillon said of him that if his natural gifts had been culti-

vated, he would have surpassed all orators. A fragment of a discourse on Eternity, which he preached at St. Sulpice, Paris, has been preserved; and La Harpe has inserted it in his Cours de Littérature.

BRIDEWELL HOSPITAL, situated in Blackfriars, London, is now used as a house of correction. The building is a large quadrangle, one side of which is occupied by the hall containing a picture by Holbein, representing Edward VI., who in 1553 converted it into a workhouse for the poor and a house of correction for the idle and vicious, delivering the charter to the corporation of London. The name originally belonged to a well dedicated to St. Bride, from which the parish of that name has been called. Henry VIII. built on this site, in 1522, a palace for the accommodation of the Emperor Charles V., which was afterwards converted by Edward VI. into an hospital, as mentioned. Prisoners here are made to work during their confinement, as in most other houses of correction; but this being one of the earliest originated the generic term, *a bridewell*, meaning a house of correction or seclusion. Bridewell is governed by a keeper, who is independent of the sheriff of London.

BRIDGE. It is needless to investigate ancient authors for a description of the primitive bridge, as its origin and elements are to be found in uncultivated nations of modern times. Stepping-stones in shallow rivers, covered with planks from stone to stone, exhibit the incipient principles of piers and arches which science has brought to their present perfection. In deeper rivers an accumulation of stones forms a loftier pier; and where the openings were sufficiently narrow, and the slabs of stone sufficiently long, or the art and strength of the untaught architect sufficient to the task, a roadway was formed from pier to pier, like the Vitruvian architrave of the primitive Tuscan temple. Among most of the nations of antiquity the arch appears to have been unknown. Even the Greeks had not apparently sufficient acquaintance with it to apply it to bridge building. No vestige of a bridge occurs in Greece belonging to the period before its occupation by the Romans. In their brightest days, when their fine style of architecture was complete, when their porticoes were crowded with paintings and their streets with statues, the people of Athens waded or ferried over the Cephisus for want of a bridge. No people of the ancient world carried the power of rearing the stupendous arch and the magnificent dome to such an extent as the Romans, who are supposed, however, to have derived their knowledge of the art from the Tuscans, whence probably it came from Greece. After the construction of their great sewers and their aqueducts, a bridge over the Tiber was of easy execution; and the invention of the architecture of stone bridges, as practised in its best and most effectual manner, must be conceded to this great and indefatigable people. The bridges of ancient Rome were eight in number: (1) Pons Sublicius; (2) Pons Fabricius; (3) Pons Cestius; (4) Pons Senatorius; (5) Pons Janiculi; (6) Pons Triumphalis; (7) Pons Aelius; (8) Pons Milvius. One of the finest examples of the Roman art was the bridge built by Augustus over the Narni, the vestiges of which still remain. It consisted of four arches, the longest of 142 feet span, and over 100 feet in height. A still more remarkable bridge, built by Trajan over the Danube, was destroyed by his successor Hadrian. The most celebrated bridges of ancient Rome were not generally, however, distinguished by the extraordinary size of their arches, nor the peculiar lightness of their piers, but their excellence and durability. The span or chord of their arches seldom exceeded 70 or 80 feet, and the versed sine or height was nearly half of the chord, so that they were mostly semicircular, or constituted a segment nearly of that form.

Among the most celebrated bridges built subsequently to the destruction of the Roman Empire, are those of the Moors in Spain, who imitated and rivalled the best constructions of the Romans. The bridge of Cordova, over the Guadalquivir, is an eminent example of their success. The bridge over the Rhone, at Avignon, begun in 1176, is one of the most ancient bridges of modern Europe. It was built by a society or order called the Frères Pontiers, or *brethren of the bridge*. It was composed of eighteen arches. The length of the chord of the largest was 110 feet 9 inches, and its height 45 feet 10 inches. The French were among the first to carry the art of bridge-making to its present perfection. The constructions of Perronet, who was chief engineer of bridges and highways in France under Louis XV. and XVI., have never been surpassed. Among them were the bridges of Nogent-sur-Seine (1766-69); Neuilly (1768–74); Louis XVI., at Paris, 1787–92. The bridge at Neuilly consists of five arches, each 128 feet span, and 32 feet rise.

In Great Britain the art of building bridges appears to have been diligently studied from early times. The most ancient bridge in England is the Gothic triangular bridge at Croyland, in Lincolnshire, said to have been built in 860. The ascent is so steep that none but foot-passengers can go over it. The longest old bridge in England was that over the Trent at Burton, in Staffordshire, built in the twelfth century, of squared freestone. It consisted of thirty-six arches, and was 1545 feet long. It has been recently pulled down. Old London Bridge was commenced in 1176, and finished in 1209. It was built on each side with houses like a regular street till 1756–8. In 1831 it was altogether removed, the new bridge, which had been begun in 1824, having then been finished. (See Pl. XIX.) It consists of five elliptical arches, of which the centre arch has 152 feet span, with a rise of 29½ feet above high-water mark. The two arches next the centre are 140 feet span, with 27½ feet rise. The total length of the bridge is 1005 feet, and the roadway is 53 feet wide between the parapets. It was erected after a design of the elder John Rennie, and cost less than half a million. Old Blackfriars Bridge was a heavy-looking structure of nine elliptical arches, the middle one 100 feet span, and others gradually decreasing. It was 43½ feet wide, and was the first bridge built with elliptical arches in this country. It is now replaced by a wrought-iron bridge, opened Nov. 6, 1869 (see *Metal Bridges*, below). Waterloo Bridge (see Pl. XIX.) is generally considered one of the finest and handsomest stone bridges yet built. The architect was the elder John Rennie. The material of the bridge is Aberdeen granite, and it consists of nine elliptical arches of 120 feet span, with a rise of 32 feet, the total length, including the approaches, being 2456 feet. The width between the parapets is 41½ feet. The roadway is almost perfectly horizontal, and the bridge was one of the first in which this construction was adopted. The former Westminster Bridge, now replaced by a handsome cast-iron structure, had thirteen large and two smaller semicircular arches, the middle one of 76 feet span. In connection with London bridges we may mention also the Holborn Viaduct, which crosses the Fleet Valley and enables the traffic to pass along a level roadway, instead of toiling up Holborn Hill and Snow Hill as formerly. It is 1400 feet long and 80 wide, 50 in the middle being carriage-way. Other English bridges of importance are the Chester Bridge, consisting of one arch 200 feet in span, probably the largest yet constructed; the Royal Border Bridge,

Berwick, 2160 feet long, with twenty-eight arches; the Congleton Viaduct, 2870 feet long, with forty-one arches; the Tyne Viaduct, 902 feet, with four arches, &c.

There are very few bridges of notable antiquity in Scotland. One of the oldest is the bridge over the Don, near Aberdeen, called the Brig of Balgownie, said to have been built by Bishop Cheyne in 1281. It consists of one large Gothic arch of 67 feet span. The bridge at Perth is a handsome structure, finished in 1772, and replacing an old bridge swept off by an overflow of the river more than a century before. The bridge at Tongueland, near Kirkcudbright, over the Dee, consists of one arch of 112 feet span. Union Bridge, Aberdeen, is an arch of 132 feet span, with 29 feet of rise. Dunkeld Bridge has five large arches, and two smaller, the middle arch is 90 feet span. The Dean Bridge, Edinburgh, is a beautiful structure, remarkable for its situation and height. It crosses the deep ravine formed by the stream called the Water of Leith, a little above St. Bernard's Well. It is 447 feet in length, 39 feet in breadth, and 106 feet from the roadway to the bed of the river. At Glasgow there are two stone bridges of modern construction and remarkable solidity and beauty spanning the Clyde, and connecting the southern with the northern division of that city. One of these was finished in 1852; the other, called the Broomielaw or harbour bridge, was erected in 1832–36, from a design by the late Mr. Telford. The arches are segments of circles, seven in number; the span of the centre arch being 57 feet 9 inches, and the rise 10 feet 6 inches. The entire length of the bridge, from centre to centre of newels, 560 feet, and from the faces of the abutments, 430 feet, of which 389 feet are open water-way. The whole breadth of the bridge within the parapets is 58 feet, of which 33 form a carriage-way, and 12 feet 6 inches on each side a footpath.

Metal Bridges are the invention of British engineers, and as they possess many advantages they have become very common. The first bridge of cast-iron ever erected was that over the Severn, about 2 miles below Colebrookdale, in Shropshire. It is an arch composed of five ribs, forming the segment of a circle. Its chord is 100 feet long, and its height 45 feet. It was erected in 1777. The bold and elegant cast-iron bridge over the Wear, at Sunderland, was opened in 1796. It has one arch of 236 feet span, and 34 feet rise, composed of six ribs. The height above low water is about 100 feet. Westminster Bridge, over the Thames, consists of seven low arches of wrought and cast iron, supported on piers of solid granite, and is no less than 85 feet wide. Blackfriars Bridge, opened Nov. 6, 1869, consists of five arches of wrought-iron, of which the centre arch is 185 feet in span, with its summit 25 feet above high water. The width between the parapets is 75 feet, the roadway in the centre being 45. In front of the piers there are short massive columns of polished red granite, with carved capitals of Portland stone. Of the two other bridges represented in Pl. XIX., the Albert Bridge, Glasgow, is a wide and handsome bridge of iron and granite, crossing the Clyde; the other, which spans the Kinzig, near Offenburg, Baden, is a wrought-iron bridge on the lattice principle. The Southwark Bridge, over the Thames, at London, consists of three arches, the chord of the middle arch being 240 feet long, and its height 24 feet. Pl. XX. represents three celebrated metal bridges. The Crumlin Viaduct, on the Newport, Abergavenuy, and Hereford Railway, rests on eight piers, formed of clusters of cast-iron columns, placed in stages. The High-level Bridge across the Tyne at Newcastle, resting on six massive stone piers, is a double bridge, supporting both an ordinary carriage road and a railway, placed 25 feet above the former. Lastly, among metal bridges the Britannia Tubular Bridge, across the Menai Strait, on the line of railway from Chester to Holyhead, forms one of the greatest triumphs of modern engineering science. See BRIDGE (TUBULAR).

Timber Bridges.—Timber is the most ready, and probably the most ancient material used for the construction of bridges. The oldest bridges on record were built of wood. The Sublician Bridge at Rome, famous for the defence of Horatius Cocles against the army of Porsena, must, according to the Roman legend, have been destroyed about 500 B.C.; but a Sublician Bridge was in existence many centuries after this. Another celebrated wooden bridge was that thrown by Julius Cæsar across the Rhine, as mentioned in his Commentaries. Germany has been the school for wooden bridges, as Britain is for those of iron. Perhaps the most celebrated of all wooden bridges was that which spanned the Rhine at Schaffhausen in Switzerland. This was 364 feet in length, and 18 feet broad. It was designed and executed by Ulric Grubenman, a village carpenter of Teuffen, in 1758. It was destroyed by the French in April, 1799. Several others have been erected in Germany by Wiebeking. In the United States of America the Trenton Bridge over the Delaware, erected by Burr in 1804, is the segment of a circle 345 feet in diameter. Its chord measures 200 feet; its height, or versed sine, is 32 feet, and the height of the timber framing of the arch, at its vertex, is no more than 2 feet 8 inches. The timber bridge over the Schuylkill, at Philadelphia, is of the extraordinary span of 340 feet. The versed sine is only 20 feet, and the height of the wooden framing, at the vertex, 7 feet. Its architect was Wernwag, who built it in 1813. The bridge built by Palmer over the Piscataqua, near Portsmouth, New Hampshire, in 1794, is the segment of a circle 600 feet in diameter. Its chord line measures 250 feet, its versed sine 27 feet 4 inches, and the height of the timber frame-work of the arch 18 feet 3 inches.

Floating Wooden Bridges are scarcely known in Britain, and but rarely met with in the United States. On the Rhine and some other continental rivers, they are often met with; but the roadway is usually run over a row of barge-shaped floats, moored side by side. A bridge of this kind was long the only passage between Pesth and Buda, across the Danube. They are often used in military operations.

Suspension Bridges, although held by some persons to be a modern invention, or derived from the rope bridges of South America and the East Indies, were in use in Europe in the time of Scamozzi, as his Idea Del Architectura Universale, 1615, testifies; yet the principles requisite to determine the structure of this kind of bridges had not been made public before the time of Bernouilli. The use of these bridges is of great antiquity in mountainous countries. An excellent example of a suspension bridge is that constructed by Mr. Telford over the Menai Strait, between the Isle of Anglesea and Caernarvonshire in Wales. It was finished in 1825. The roadway is 100 feet above the surface of the water at high tide. The opening between the points of suspension is 580 feet. The platform is about 30 feet in breadth. The whole is suspended from four lines of strong iron cables by perpendicular iron rods, 5 feet apart. There are many other suspension bridges in Great Britain; as Hammersmith Chain Bridge—a fine and solid construction, planned by Mr. Clark, finished 1827. The Union Suspension Bridge near Berwick is 449 feet long. The suspension bridge over the Avon at Clifton is 702 feet in length, and 245 feet

above high-water mark. The Friburg Suspension Bridge in Switzerland is 880 feet long; that over the Danube connecting Buda with Pesth is 666 feet. In the United States such bridges are also common. That over the Merrimack, at Newburyport, is a curve with a chord 244 feet. The railway suspension bridge over the Niagara, supported by wire cables, is 822 feet long; the platform, which carries three lines of rails, being 245 feet above the river. Another bridge, 7 miles below the falls, has a span of 1040 feet. A suspension bridge of great magnitude, to be called the East River Bridge, is in process of construction, to connect the city of New York with Brooklyn. The central span will be 1595½ feet from tower to tower; the whole amount of suspension in three main openings 3455 feet; and the total roadway, of which the bridge forms a portion, will be 5989 feet, connecting the City Hall, New York, with the Square at Brooklyn. The height of the bridge will allow all vessels under 1000 tons to pass clear. The roadway, besides being a railway, will afford accommodation for carriages and foot passengers. The total width of the structure will be 85 feet.

Construction of Bridges.—The theory of stone bridges involves mathematical demonstrations and calculations of great complexity; the properties of the arch, the thickness of the piers, and the force of the water form separate elements in the computation. The arch is a series of wedge-formed bodies cemented together and rendered coherent by mutual pressure, the first and last being sustained by a support or abutment. The centre arch-stone or *voussoir* (a French term) is the highest part or crown of the arch, and is called the keystone. The interior surface of the arch is called the *intrados*, the part immediately under the keystone is called the *soffit*, the remaining portions the *flanks*. The term soffit, however, is sometimes used synonymously with intrados. The exterior surface is called the extrados, or back of the arch. The points of junction between the flanks and the abutments are called the springings; the distance between them horizontally is the span; the perpendicular from the soffit to a straight line drawn between them is called the rise, or height of the arch. It has been found that in the construction of an arch the slipping of the stones upon one another is prevented by their mutual pressure and the friction of their surfaces; the use of cement is thus subordinate to the principle of construction in contributing to the strength and maintenance of the fabric. This self-supporting power of the arch is a recent discovery. The line of resistance of the materials forming any structure, whether straight or curved, being capable of geometrical calculation, it can be determined beforehand whether this line will fall within or intersect each successive joint of the structure; if it does, the mass will not be liable to turn over on the edge of any particular joint. By a more exact calculation of the line of resistance, even the slipping of one joint upon another can be obviated by the form of the structure. This is called determining the line of pressure. Upon these two lines the equilibrium of the structure depends. The lines of pressure and resistance in the arch of a bridge are calculated so as to pass into the abutments or piers, where they take a new direction; the strength of the abutments or piers, and the amount and direction of the strain upon them, being calculated by the architect so as to render them capable of permanently supporting the fabric. When the pressure upon an arch causes it to give way, it breaks into four parts, the stones turning inwards upon their superior edge at the crown, and outwards on their inferior edge at two points in the haunches where the line of resistance reaches the interior edge, and which are called the points of rupture. The ancients, being unacquainted with the full theory of the arch, usually made their arches more numerous, of smaller span, and with stronger piers than are found necessary in modern structures. Another advantage which the modern architect of bridges has over the ancient, is in the invention of the cofferdam. This is a water-tight case made to protect the middle piers of a bridge, by driving piles down to the solid foundation, and filling them up with clay or other impermeable material (see COFFERDAM), so as effectually to exclude the water. In constructing a bridge, it is desirable to have the smallest possible number of points of support. Piers in the water-way are not only expensive to form, but obstruct the navigation of the river. The new London Bridge is represented as a model in this respect, the width of its arches and the lightness of its piers offering the least possible obstruction to the navigation. When the water-way is obstructed the bridge itself is exposed to danger, the wearing action of the water sometimes undermining the piers on which it rests. The pier, at the point where it supports the arch, is usually oblong in form, and increases in breadth to the foundation. The rate of increase in modern bridges is frequently 3 inches to the foot. The ends of piers are provided with salient angles to act as cut-waters; the form of these differs according to circumstances. In building the arch of a bridge, a timber frame-work is used called a *centre*, or *centering*, a name derived from the French *cintrer*, to form an arch. The *centre* has to keep the stones or *voussoirs* in position till they are keyed in, that is, fixed by the completion of the central part; its construction is a matter demanding the utmost care of the architect. On removing this framework, which is called striking the centre, what is called the settlement of the arch takes place, the central *voussoirs* move slightly downwards, while a corresponding rise takes place in the flanks. Before striking the centre of the bridge of Nogent-sur-Seine, Perronet caused three lines to be cut, one horizontally over the crown, and two obliquely from the extremities of this line to the springings. On the striking of the centre these lines were found to have altered their forms and relative positions. From straight lines they had become curves. The horizontal line had sunk, and its greatest deflection was above the key, while the oblique lines from the springings were deflected upwards. The spandrils of a bridge are the spaces between the haunches of the arch and the point of junction of the extrados with the roadway. These are frequently filled up with rubble-work or gravel. They are sometimes left open to give greater lightness to the structure. The former plan has been generally adopted in the large French bridges, the latter is recommended by Telford. Owing to the superior skill of modern engineering, the roadway of bridges is made much wider and more level than was previously attainable. The foundation of the roadway is laid at the ends with rubble, in the middle with gravel mixed with loam to exclude water. Stone gutters are provided. Suspension bridges are much lighter than stone bridges, and being entirely independent of central supports, do not interfere with the river, and are not liable to be affected by its currents. The entire weight of a suspension bridge rests upon its piers, from which it is suspended freely at an elevation above the level of the pressure. Hence the bridge rights itself after a temporary displacement with a vibratory movement which imparts a peculiar sensation to the passenger. The modes of constructing and suspending these bridges are various, and our space will not permit us to enter into details regarding them. One of the most re-

markable of these bridges, both for dimensions and situation, is the wire suspension bridge over the Niagara. This bridge is nearly 800 feet in length, and is suspended 260 feet above the river. 'Stepping upon the bridge, before you walk 20 feet from the shore, you find yourself suspended in the air several hundred feet above a mass of jagged and flinty rocks, over and among which the waters of Niagara plunge with terrific velocity. To add to the sensations of terror which this fearful scene is calculated to produce at first glance, you find the bridge oscillating and bending beneath your weight. It requires considerable nerve to cross this aerial structure, and there are few who have firmness enough to look over the side into the awful surf.'

Bridges are now frequently constructed with arches, or ribs and spandrils, of cast or wrought iron. The use of iron in the formation of bridges is a modern invention, by which greater strength is secured, in proportion to the weight of the material employed. The first iron bridges in this country were erected from about 1777 to 1790. Cast-iron was at first employed, but wrought-iron has been found to confer greater advantages. The same general principles apply to the construction of iron as of stone bridges, but the greater cohesion and adaptability of the material give more liberty to the architect, and both in suspension and in arched bridges much greater width of span is possible than in arched bridges built entirely of stone. See BRIDGE (TUBULAR).

BRIDGE, TUBULAR. At first iron bridges were erected in the form of arches, and the material employed was cast-iron, but the arch has now been generally superseded by the beam or girder, with its numerous modifications; and wrought-iron is likewise found to be much better adapted for resisting a great tensile strain than cast-metal. Numerous modifications exist of the beam or girder, but of these none is more interesting than the tubular or hollow girder, rendered so famous by its employment by Mr. Robert Stephenson, in the construction of the railway bridge across the Menai Straits. It has also been employed in other railway bridges. We now proceed to give an account of this bridge, a view of which is given in Pl. XX. of this Encyclopedia.

The Britannia Tubular Bridge, so called from the Britannia rock on which its central pier rests, carries the Chester and Holyhead Railway across the Menai Straits, and is situated about a mile from Telford's celebrated suspension bridge. Mr. Stephenson's original intention was to have constructed an arched bridge of cast-iron, but this was prevented by the conditions insisted on by the lords-commissioners of the admiralty, as conservators of the navigation, that the height from the level of the water to the lowest part, or springing of the arches, should be not less than 105 feet. As this would have involved an immense additional expense, by necessitating an increase of 50 feet in the height of the whole structure, the project of a cast-iron arched bridge was abandoned, and that of a tubular girder bridge substituted in its place. The tubes are of a rectangular form, and constructed of rivetted plates of wrought-iron, with rows of rectangular tubes or cells for the floor and roof respectively. The bridge consists of two of these enormous tubes or hollow beams, laid side by side, one for the up and the other for the down traffic of the railway, and extending each to about a quarter of a mile in length. In point of fact, however, each tube is divided into four parts, which are joined end to end at the piers. The bridge consists of four spans, two principal spans of 460 feet each, over the water, and two smaller ones of 230 feet each, over the land.

Other tubular bridges of importance are the Conway Bridge, over the river Conway, an erection identical in principle with the Britannia Bridge, but on a smaller scale; the Brotherton Bridge over the river Aire; the tubular railway bridge across the Damietta branch of the Nile, which has this peculiarity that the roadway is carried *above* instead of *through* the tubes; and the Victoria Bridge over the St. Lawrence, Canada, completed on 25th August, 1860. In many respects this structure is even more remarkable than the Britannia Bridge, being supported by twenty-four piers, and nearly 2 miles in length, or about five and a half times that of the bridge across the Menai Straits.

BRIDGENORTH, a municipal and parliamentary borough and market-town, England, Shropshire, 19 miles S.E. from Shrewsbury, on the Severn, which divides it into two portions, called the High and Low Towns, connected by a handsome bridge of six arches. The High Town is about 200 feet above the bed of the river. The steep acclivity here is covered with houses, the foundations of the one row being higher than the chimneys of the other. These are approached by a winding carriage-road, or more directly by flights of steps cut in the rock, and rendered safe by iron railings. The principal manufacture is carpeting, which is carried on to a great extent. Pop. in 1871 (mun. bor.), 5876; (parl. bor.), 7317.

BRIDGEPORT, a city and seaport of Fairfield county, Connecticut, U.S., 58 miles N.E. of New York, is situated on an arm of Long Island Sound, at the mouth of the Pequonnock River. The harbour has a bar with 13 feet of water at high tide, and is crossed 1½ mile from the entrance by a bridge 1237 feet long. There is a lighthouse on Fairweather Island. Bridgeport has a large coasting trade, and a number of vessels engaged in whale-fisheries, but is chiefly supported by its manufactures, including the large sewing-machine factories of Wheeler, Wilson, & Co. The city is handsomely laid out, and beautifully shaded with trees. There is daily steam-boat communication with New York. The population of Bridgeport has increased very rapidly since 1850, when it was 7560; by the census of 1870 it was 18,969.

BRIDGET, the name of two saints in the Roman Catholic Church.—The first, better known as ST. BRIDE, was a native of Ireland, and born at Fochard, in the county of Armagh, in the end of the fifth or beginning of the sixth century. She was exceedingly beautiful, and to avoid the offers of marriage and other temptations to which this worldly advantage exposed her, implored God to render her ugly. The prayer was granted, and retiring from the world Bridget built herself a cell under a large oak, which she called Kill-dara or Kildare, the cell of the oak. Hither she was followed by numerous other virgins, and an order of nuns was established, which spread into different countries, and continued to flourish for centuries, but is now extinct. St. Bride was held in great reverence in Scotland.——The second ST. BRIDGET, or more properly Birgit or Brigitte, was the daughter of a Swedish prince, born about 1302, and died at Rome in 1373, on her return from a pilgrimage to Palestine. At the age of sixteen she married Ulf Gudmarssen, afterwards seneschal of Nericia, by whom she had eight children, and her husband and she then made a vow of mutual continence, while on a pilgrimage to the shrine of St. James in Spain. On their return her husband died, and she founded the convent of Wadstena, in East Gothland, under the rules of St. Augustine. St. Bridget was canonized on 7th October, 1391. She had left, under the title Revelations, a series of mystic writings, which, after due examination by the proper

authorities, were pronounced inspired by Gregory XI. and Urban VI. The Revelations have been translated into Latin and French. The order of St. Bridget, called also sometimes that of St. Salvator, or the Holy Saviour, continued in Sweden till the Reformation, and still includes some religious houses in Italy, Portugal, and other countries. Her youngest daughter, Catherine, was also canonized, and became the patron saint of Sweden.

BRIDGETON, a city, port of entry, and capital of Cumberland county, New Jersey, U.S., is situated on both sides of Cohansey Creek, 20 miles above its entrance into Delaware Bay, and is 40 miles S. of Philadelphia. It has an extensive iron-foundry and other manufactures, besides an active shipping trade. Pop. in 1870, 6830.

BRIDGETOWN, the capital of the island of Barbados, in the West Indies. It extends along the shore of Carlisle Bay, on the S.W. coast of the island, and is nearly 2 miles long, and about half a mile broad. On entering the port, its appearance is very pleasing, the houses being embosomed in trees, while hills of moderate height rise behind, studded with elegant villas. Many of the houses have balconies, painted in gay colours, which give them a lively and cheerful appearance. The town contains a handsome square, called Trafalgar Square, in which there is a bronze statue of Lord Nelson, placed there with great ceremony in 1813. The principal buildings, none of which are in any way remarkable, are—the Church of St. Michael, now the cathedral of the diocese, a large but plain edifice, rebuilt in 1789; the Church of St. Mary, the Jewish synagogue, the Central School, Harrison's Free School; a handsome market-place, shaded by trees; the barracks at the S. extremity of the city, and the military hospitals. Bridgetown has been at several periods much damaged by fire; the last calamity of that kind occurred in 1845, when a large portion of the town was destroyed. The pop. is 21,384.

BRIDGEWATER, a municipal borough and port in the county of Somerset, England, on the Parret. Although the town is 12 miles by water from the sea, the tide rises 6 fathoms at high water, and flows in with such impetuosity as frequently to injure the shipping. This phenomenon is called the *bore*, and is not uncommon in the rivers which flow into the Bristol Channel. The river divides the town into two nearly equal parts, which are connected by an elegant iron bridge of one arch. The houses are generally well built, and chiefly of red brick. Among the chief buildings are the parish church (St. Mary's), a handsome ancient structure with a tower and spire, St. John's Church, and the new town-hall, a handsome building in the Venetian style, completed in 1865. There are two endowed schools, and a school of art. The Parret is navigable up to Bridgewater for vessels drawing 19 feet, and a considerable shipping trade is carried on, the vessels entered in 1871 being 4131, tonnage 213,052. It has few manufactures, the chief being that of bath-bricks, which are made here in great quantities. Ordinary bricks and earthenware are also made, and there are railway-carriage works, breweries, tanneries, &c. Bridgewater obtained its ancient name, *Burgh Walter*, from its having belonged to Walter de Douay, one of William the Conqueror's followers, to whom it was given by that monarch. In the civil wars of the seventeenth century the inhabitants embraced the royal cause, and defended the town resolutely against the Parliamentarians, but were subdued by Fairfax, who carried off a large booty, and 1000 prisoners. In the castle built by King John the Duke of Monmouth lodged, and was here proclaimed king, in 1685, before the battle of Sedgemoor, which was fought about 3 miles from the town. Bridgewater then became the theatre of Feversham's and Jefferies' barbarity. Up till 1870, when it was disfranchised for bribery, Bridgewater returned two members to Parliament. Pop. in 1871, 12,101.

BRIDGEWATER, Francis Egerton, Duke of, a British nobleman whose enlightened patronage of Brindley was the means of developing the genius of that celebrated engineer, and procured for himself the title of the Father of British Inland Navigation, was the youngest son of Scroop, fourth earl and first duke of Bridgewater, and born in 1736. He died unmarried on 8th March, 1803. In 1748 he succeeded his elder brother, the second duke. His estate of Worsley contained valuable coal-mines, and with the view of establishing a communication between these and the town of Manchester, at 7 miles' distance, he conceived the idea of effecting this object by a navigable canal. Having accidentally made the acquaintance of Brindley, and perceived his great engineering talents, he employed him in the construction of this work, which, after encountering much opposition and ridicule, was at last triumphantly carried through. (See Brindley.) To the execution of this scheme the duke devoted all his energies and fortune, restricting his expenditure for many years to £400 per annum.

BRIDGEWATER CANAL. See Canal.

BRIDGEWATER TREATISES. The Rev. Henry Francis, earl of Bridgewater, who died in 1829, bequeathed a sum of £8000, which, with the interest that might accrue on it, was to be placed at the disposal of the president of the Royal Society for the time being, and paid by him to the person or persons whom he should appoint to write and publish 1000 copies of a work, On the Power, Wisdom, and Goodness of God, as manifested in the Creation; illustrating such work by all reasonable arguments, as for instance, the variety and formation of God's creatures, in the animal, vegetable, and mineral kingdoms; the effect of digestion and thereby of conversion; the construction of the hand of man, and an infinite variety of other arguments; as also by discoveries, ancient and modern, in arts, sciences, and the whole extent of literature. The president of the Royal Society, then Davies Gilbert, consulted with the Archbishop of Canterbury and Bishop of London as to the best mode of giving effect to the intentions of the munificent testator, and acting on the suggestion which, in the above direction, he appears to have thrown out, resolved, instead of intrusting the execution of the work to one individual, to employ eight of the most distinguished in each of their several departments. Their names are Dr. Chalmers, Dr. Kidd, Dr. Whewell, Sir Charles Bell, Dr. Roget, Dr. Buckland, Rev. William Kirby, and Dr. Prout. The works thus written and published are known by the above name of the Bridgewater Treatises.

BRIDLE, the headstall, bit, and reins, by which a horse is governed. It is an instrument of high antiquity. Pliny ascribes the invention of the bridle to Pelethronius, king of the Lapithæ. The first horsemen guided their horses with a rope or stick, and the sound of their voice. A cord drawn through the nose is sometimes used for other animals. The ancient Thessalian coins often represent a horse with a long rein trailing on the ground. The Romans were trained to fight without bridles, as an exercise in the manege. On Trajan's Column soldiers are thus represented at full speed. The parts of a modern bridle are the snaffle or bit; the headstall, or leathers from the top of the head to the rings of the bit; the fillet, over the forehead, and under the fore-

top; the throat-band, which buttons under the throat; the reins; the nose-band, buckled under the cheeks; the trench, the cavesan, the martingal, and the chaff-halter.

BRIDLINGTON, or BURLINGTON.—1. A town of Yorkshire, England, agreeably situated about a mile from the sea, 37 miles N.E. from York, on the Hull and Scarborough Railway, and consisting of one principal and several smaller streets. The parish church forms part of an ancient priory of elegant architecture, but now much defaced. There are several Dissenting chapels and a free grammar-school. A considerable trade is carried on in corn. Pop. in 1871, 6203.——2. BRIDLINGTON QUAY, a favourite bathing place on the Yorkshire coast, about a mile S.E. of Bridlington. It consists of one principal and several smaller streets, and has a handsome district church, Wesleyan and Primitive Methodist chapels, and an excellent habour, affording secure shelter to coasting vessels during adverse gales.

BRIDPORT, a seaport and market-town, Dorsetshire, England; lying between the rivers Bride and Asher, in a fertile valley surrounded by hills, 14 miles W. from Dorchester. The Bride and Asher unite about a mile S. of the town, and form a safe and commodious harbour for vessels not over 250 tons. Bridport consists mainly of three spacious streets, containing many well-built modern houses, chiefly of brick, and some of Portland stone. In the centre of the town is the market-house, a handsome building in the Grecian style, containing the town-hall in the second story. The church is a beautiful structure, and contains a fine organ. There are besides several Dissenting chapels, numerous schools, a mechanics' institute; and extensive manufactures of shoe-thread, sail-cloth, and hempen goods. In 1871 92 vessels, with a tonnage of 9048, entered or left the port of Bridport with cargoes. Pop. (1871), 7670.

BRIDPORT, ALEXANDER HOOD, ADMIRAL LORD, the youngest brother of Admiral Hood, was born in 1726, died 1814. He distinguished himself in Howe's victory, 1st June, 1794, and defeated the French fleet off L'Orient, 22d June, 1795. He was appointed commander of the Channel Fleet in 1796, and created Viscount Bridport, 10th June, 1801.

BRIEF, from the French *bref*, which comes from the Latin *brevis*, denotes a thing of short extent or duration. It is more particularly used for a summary or short statement.

BRIEF, in law, signifies an abridgment of the client's case, made out for the instruction of counsel on a trial. In this the case of the party is to be concisely but fully stated; the proofs are to be placed in due order, and proper answers made to whatever may be objected against the cause of the client. In preparing the brief, great care is requisite that no omission be made which may endanger the case.

BRIEF, PAPAL, is a sort of pastoral letter, in which the pope gives his decision on some matter which concerns the party to whom it is addressed. The brief is an official document, but of a less public character than the bull. It is written in a different manner, the bull being on parchment, and written in old round Gothic characters, while the brief is written on paper in Italian hand. It usually deals with matters comparatively private and subordinate, not, as the bull, with matters affecting the church at large or an entire nation. It is not signed by the pope himself, but by an officer called *Il Segretario de' Brevi*, and is sealed on red wax with the pope's private seal, the fisherman's ring. Briefs are distinguished into two kinds—apostolical, those which issue from the pope himself; and penitentiary, issuing from the office which bears that name.

BRIEG, a town, Prussia, in the province of Silesia, on the left bank of the Oder, which is here crossed by a long wooden bridge, 26 miles S.E. from Breslau, with 15,367 inhabitants. It was the seat of a duchy, and is surrounded by old fortifications, which have partly been converted into walks; is entered by five gates; contains two Lutheran and two Roman Catholic churches, a synagogue, and a gymnasium with a good library attached; and has manufactures of linen, woollen, and cotton goods, ribbons, lace, leather, &c., and a trade greatly promoted by the completion of the Vienna and Breslau Railway.

BRIEL, or BRIELLE, sometimes called the *Brill*, a town of the Netherlands, near the mouth of the Maas, province of South Holland, with a good harbour, well built, and strongly fortified. It is remarkable in history as the place where the Confederates laid the foundation of the Dutch Republic in 1572. The Netherlanders, who had fled from the persecutions of the Duke of Alva, equipped a small fleet in England, and were carried accidentally by an unfavourable wind to Briel, which capitulated to them, and thus became the cradle of Dutch liberty. Briel was surrendered to the English in 1585 in security for the succours afforded to the Confederates by Elizabeth, and restored by James I. in 1616. Van Tromp was born here. The pop. is 4360, principally engaged in the fisheries.

BRIENNE, a small town in the department of the Aube (Upper Champagne), consists of Brienne-la-Ville and Brienne-le-Château, containing 2000 inhabitants. It has various manufactures, and stands among vineyards. In the military academy formerly existing at Brienne-le-Château, Napoleon received his first instruction in the military art. Brienne-le-Château was afterwards celebrated as the scene of a portion of the final struggle in 1814, in which the empire was overthrown. 160,000 Russians and allies had crossed the Rhine at Basel; Blücher, with 60,000 combatants, had effected his passage at Mannheim, Mainz, and Coblenz. Napoleon attacked Blücher on 27th January at St. Dizier, and on the 29th at Brienne, with a view to prevent the junction of the allies. The battle was renewed on the 30th, and Blücher compelled to retreat to Trannes. Napoleon advanced to La Rothière; but the Russians having effected their junction with Blücher, Prince Schwartzenberg gave orders, on the 1st of February, to renew the combat. Despite the utmost exertions of Napoleon the French were defeated after a sanguinary struggle, in which each side lost about 5000, and on the following night they evacuated Brienne, leaving 9000 prisoners and seventy pieces of artillery in the hands of the enemy. Brienne was nearly destroyed in the battle of the 29th.

BRIENNE, CARDINAL DE LOMENIE DE. See LOMENIE DE BRIENNE.

BRIENNE, GAUTIER DE, descended of the Counts of Brienne, a French noble family, was killed at the battle of Poitiers in 1356. He was titular Duke of Athens, but was never in actual possession, having been despoiled of his dukedom in 1312, when his father was killed at the battle of Cephisus. He passed his youth at the court of Robert, king of Naples, and when the Florentines, menaced by Castruccio, gave the lordship of their city to the Duke of Calabria, Robert's son, he was sent in 1326 to take possession of it. He afterwards, in 1331, embarked at Brindisi with a body of troops with the view of reconquering his Grecian dukedom, but the expedition proved an utter failure. He then retired into France, where in 1339 and 1340 he took part in the wars of Philip VI. against the English. The Pisans having in October, 1341, seized Lucca, the people of Florence deposed their military commandant, and confided the

government of the city to Gautier in preference to other rivals (1342). Previous to the election he deceived all parties by the lavishness of his promises and his oaths; but the moment he was in possession he gave loose reins to his passions, amassing enormous sums by the most shameful exactions, sending to the scaffold every respectable citizen who seemed to stand in his way, making a disgraceful league with the Pisans, because it tended to give additional security to his tyranny, and abandoning himself in private to every species of profligacy. At length the public indignation could no longer be restrained—the whole people flew to arms as one man, and he was ignominiously expelled in 1343. He afterwards passed into France, and in 1356 obtained from King John the office of Constable.

BRIENNE, JOHN OF, a celebrated Crusader, born 1148; died 1237; was son of Erard II., count of Brienne; was present at the siege of Constantinople in 1204, and afterwards, in 1209, married the granddaughter and heiress of Amaury, king of Jerusalem. Brienne thus obtained an empty title, and having been crowned at Tyre in 1210, defended himself, though with a very inferior force, against the attacks of the Saracens. The Emperor Frederick II., having engaged to join the Crusade, provided the sovereignty of the Holy Land were ceded to him, Brienne abdicated in his favour, and gave him his eldest daughter Yolande in marriage. He afterwards in 1222 married Berengaria, sister of Ferdinand of Castile, as his second wife, and retired from the East; but the state of affairs there again brought him on the stage. Baldwin II., a mere boy, had become Emperor of Constantinople. He was unable to contend with the difficulties by which he was surrounded, and it was therefore resolved to associate Brienne with him in the imperial dignity. He consented, giving Baldwin his youngest daughter in marriage, was crowned Emperor of the East in 1231, and continued by a series of heroic deeds to defend his dominions against all aggressors, and more especially against the united forces of Vataces, emperor of Nicæa, and Azan, king of Bithynia, who mustered against him a land force of 100,000 men and a fleet of 300 ships of war, but sustained a signal and disgraceful defeat.

BRIENZ, a town, Switzerland, canton Bern, beautifully situated on a narrow ledge at the foot of the Bernese Alps, and on the N.E. shore of the Lake of Brienz, the shore of which, in the vicinity of the town, is lined with gardens. The church, built in 1215, together with some old ruins and a handsome school, is finely situated on a height. Brienz is a frequent resort of tourists *en route* through the Pass of Brünig to Lucerne. In the neighbourhood is the Lake of Brienz (Brienzer See), one of the most picturesque in Switzerland, which is formed by the river Aar, and throws itself through the Valley of Interlaken, into the Lake of Thun (Thuner See), which is on a level of 24 feet below it. The trade is in excellent cheese. Pop. 2280.

BRIEUC, ST. (*Briocum*), a town, France, in the department of Côtes du Nord, about a mile above the mouth of the Gouët, in the Bay of St. Brieuc. It is very poorly built, but contains an ancient cathedral, a diocesan seminary, a school of hydrography, and a library of 20,000 volumes. Its port, in the village of Légué, at the mouth of the river, admits vessels of 300 to 400 tons, and is engaged to some extent in the Newfoundland cod fishery. On a height near it are the remains of the Tower of Cesson, which is visible 15 miles at sea. Pop. 15,341.

BRIG, or BRIGANTINE, a square-rigged vessel with two masts. The term is applied to different kinds of vessels by mariners of different countries. The term *brigantine* was formerly applied to a light, flat, open vessel, with ten or fifteen oars on a side, furnished also with sails, and able to carry upwards of 100 men. The rowers being also soldiers, had their muskets lying ready under the benches. Brigantines were frequently made use of, especially in the Mediterranean, for the purpose of piracy, from which they derived their name, being very fast sailers.

BRIGADE, in general an indeterminate number of regiments or squadrons. In the British army a brigade of infantry is generally composed of three regiments; a brigade of horse, of from eight to twelve squadrons; and one of artillery, of five guns and a howitzer. A number of brigades form a division, and several divisions an army corps. A brigade-major is the chief of the brigade-staff. A brigadier-general is the officer who commands a brigade. In the British service this rank is now abolished. In the United States army two regiments of infantry or cavalry constitute a brigade, which is commanded by a brigadier-general. The brigade was introduced by Gustavus Adolphus, whose example was followed by Turenne, who formed brigades of 3000 to 4000 men. The use of the term in the French service is somewhat equivocal. In the gendarmerie, as formerly in the cavalry, a brigade is the small fraction of an army under the command of a subaltern officer. In the regular army a brigade now contains two or three regiments of infantry or cavalry, or else a mixed body.

BRIGANDINE, a kind of defensive armour worn in the middle ages, consisting of thin jointed scales of plate, pliant and easy to the body. The brigandine was lined and covered with leather or quilted linen, and formed a coat or tunic.

BRIGANTINE. See BRIG.

BRIGGS, HENRY, a celebrated mathematician, born in 1556 at Warley Wood, near Halifax, Yorkshire, entered St. John's College, Cambridge, and distinguished himself by his acquirements in mathematics. In 1596 he was appointed first lecturer on geometry in the newly-erected establishment of Gresham House or College, London, and in 1619 became in like manner first Savilian professor of geometry at Oxford. This professorship he held till his death in 1630. In 1614 Napier published his invention of logarithms; and Briggs, who was so much struck with it that he declares he had never seen a book which pleased him better or made him more wonder, determined to pay him a visit. He accordingly went to Scotland in 1616 and 1617, and was hospitably received by Napier, whose house for the time became his home. Napier died in 1618. It is admitted on all hands that the invention of logarithms originated with him; but after his death Briggs put forth a claim to a very important improvement; and the extent to which it ought to be allowed has become the subject of a very keen discussion between the friends and admirers of the two parties. It were out of place here to enter into the question; and it is not necessary to exalt the merit of the one of these distinguished individuals by detracting from that of the other. Each did enough to place himself on a pedestal apart and justify a claim to the homage of all true admirers of genius. Briggs' great works are his Chilias Prima Logarithmorum (1618), Trigonometria Britannica (1633), and Arithmetica Logarithmica (1624).

BRIGHT, in painting; a picture is said to be bright when the lights so much prevail as to overcome the shadows, and are kept so clear and distinct as to produce a brilliant appearance.

BRIGHTON (formerly *Brighthelmstone*), a maritime town and favourite watering-place in England, county of Sussex, at the junction of the London and Brighton with the South Coast Railway, 50½ miles

from London. It is situated on a gentle slope, stretching along the shore for nearly 4 miles. It is protected from the N. winds by the high lands of the South-downs, immediately behind the town. Brighton comprises about 600 streets, terraces, squares, &c., many of them handsome. The principal streets have a slight curve in conformity with the shore line. In front of the town is a stupendous sea-wall, extending nearly 2 miles, and supporting a spacious drive and promenade. The buildings of note are few. The most remarkable is the Pavilion, built by George IV., but in 1850 dismantled, and afterwards purchased by the commissioners of Brighton. It is a building in the oriental style of architecture, with numerous cupolas, spires, and minarets, resembling the Kremlin at Moscow. It has a handsome stone front 200 feet in length, with a large oriental dome 130 feet high in the centre. Since 1864 the principal suite of rooms has been restored to its pristine state —the original decorations having been presented to the town by the queen—and the rooms are now used for balls and other entertainments. One of the wings has been turned into a museum of natural history and ethnology; and the building which was formerly used as stables has been converted into an assembly-room, capable of holding 3000 persons. It is elegantly decorated, and provided with a powerful organ. The riding-school has been converted into a corn-exchange, and drill-hall for the volunteers. The whole structure, with its out-buildings and gardens, which are open to the public as pleasure-grounds, covers about 9 acres. Opposite the palace east front, within a railed area called the Steyne, stands a bronze statue of George IV. by Chantrey. Other buildings worthy of notice are the town-hall, a large massive building of recent erection, the market-house, the county hospital, the eye infirmary, the blind asylum, and the orphan asylum. A fine concert-hall was finished in 1868. The chain-pier is an object of great utility and ornament, 1134 feet long and 13 feet wide, erected in 1826 at a cost of £30,000. In 1866 a larger and finer pier was constructed, to the westward of the Steyne, with a length of 1115 feet, and a breadth varying from 140 to 55. Several of the hotels are very handsome buildings. The Grand Hotel, completed in 1865, is a palatial edifice nine stories high, and is said to have cost upwards of £150,000. It contains many splendid rooms, including drawing-rooms, libraries, coffee-rooms, smoking-rooms, billiard-rooms, and 150 bed-rooms and dressing-rooms. The Norfolk Hotel is also a fine building, fitted up in luxurious style. Brighton has in all above seventy places of worship, of which nearly thirty belong to the Establishment, but none of these are very remarkable from an architectural point of view. St. Peter's, situated at the N. end of the town, is a beautiful Gothic structure, and is considered an excellent modern specimen of the style. The educational institutions comprise the Brighton College, for the education of the sons of noblemen and gentlemen; an institution for the education of the daughters of poor clergy; a diocesan training-school for schoolmistresses; National, British, and other schools, including a vast number of boarding-schools. Brighton has no manufactures, the greater portion of the inhabitants being almost exclusively engaged in providing for the accommodation and comfort of the numerous visitors who resort to the town. The mackerel and the herring fisheries are extensively carried on.

Brighton was anciently a fortified town of considerable importance, but was gradually washed away by the encroachments of the sea. In the reign of Elizabeth the town stood where the old chain-pier stands; and but for the sea-wall the modern town might have shared a similar fate. The advantages of Brighton as a watering-place were comparatively unknown until it became the residence of George IV. when Prince of Wales. Races are held in the neighbourhood. Brighton sends two members to Parliament. The pop. in 1801 was only 7339; in 1861 it was 77,693; and in 1871, 90,013, within the municipal boundaries. Within the parliamentary boundaries the pop. in 1861 was 87,317; in 1871, 103,760.

BRIGNOLES (*Brinonia*), a town in France, department of Var, 22 miles W.S.W. of Draguignan, pleasantly situated in a fertile valley, surrounded by wooded hills, and watered by a small stream named the Calami. It is well built, and has several squares planted with trees and ornamented with fountains. Brignoles possesses a normal school for the department, is the seat of courts of first resort, and has long been celebrated for its salubrity, having been also formerly the summer residence of the Counts of Provence. It manufactures common cloth, silk, crockery, soap, wax candles, glue, and has distilleries, several extensive tanneries, and silk and fulling mills. The neighbourhood produces olive-oil, and large quantities of excellent prunes, called *prunes de Brignoles*. Brignoles was taken and sacked in 1595 by Charles V. Pop. 5945.

BRIL, the name of two brothers who distinguished themselves as landscape painters.—1. MATTHEW, born at Antwerp in 1550, died in 1584, repaired when a very young man to Rome, and was so much esteemed by Gregory III. that he was employed on the galleries and saloons of the Vatican.——2. His brother PAUL, born about 1556, died about 1626, was much superior to him; and hearing of his success at Rome, joined him there. The two brothers appear for some time to have worked together on the same pieces; but after Matthew's early death, Paul was employed by Sixtus V., and executed six large paintings in his summer palace. He also executed a large fresco 68 feet long, and proportionably high, in the Sala Clementina of the Vatican for Clement VIII. Its subject is the Martyrdom of St. Clement. His chief merit is the improvement he effected in landscape-painting, which he is said to have been the first to raise to the dignity of an independent branch of art, by lowering the line of the horizon, previously placed too high, and introducing a unity of light favourable to the general effect. In the latter part of his life he painted some exquisitely finished miniature landscapes on copper.

BRILL, or PEARL (*Rhombus vulgaris*), a fish resembling the turbot, but inferior to it both in size and quality, and distinguished from it by its inferior breadth, and by the perfect smoothness of its skin, being devoid of bony tubercles. The brill is of a pale-brown colour above, marked by scattered yellowish or reddish spots, and covered with moderately sized scales. It is found on many parts of the British coast, and is particularly abundant in the English Channel, from which large quantities are sent to the London market. Though inferior in flavour to the turbot, its flesh is of good quality.

BRILLIANT. See DIAMOND.

BRIMSTONE. Sulphur, as first obtained, is generally mixed with foreign bodies, and for the purpose of purification is melted in a close vessel, by which the impurities are allowed to subside. It is then poured, in the liquid state, into cylindrical moulds, in which it becomes hard, and is known in commerce by the name of *roll brimstone*. The roll brimstone of Italy and Sicily does not contain more than 3 per cent. of extraneous matters. See SULPHUR.

BRINDISI (ancient *Brundusium*), a seaport and fortified town in the province of Leno, Southern

Italy, 45 miles E.N.E. of Taranto. In ancient times Brundusium was one of the most important cities of Calabria. It is said by Strabo to have been governed by its own kings at the time of the foundation of Tarentum. It was one of the chief cities of the Sallentines, and the excellence of its port and commanding situation in the Adriatic were among the chief inducements to the Romans to attack them. The Romans made it a naval station, and frequently directed their operations from it. It was the scene of important operations in the war between Cæsar and Pompey. On the fall of the Western Empire it declined in importance. In the eleventh century it fell into the possession of the Normans, and became one of the chief ports of embarkation for the Crusades.

Its importance as a seaport was subsequently completely lost, and its harbour blocked. In 1870 the Peninsular and Steam Navigation Company put on a weekly line of steamers between Brindisi and Alexandria for the conveyance of Her Majesty's eastern mails, and at the same time made it a port of transit for goods brought from India by these steamers to be forwarded to the N. of Italy by rail. From this cause the imports of Brindisi have suddenly risen in importance, and are likely still further to expand. The trade of the port in 1871 represents a total of 758 vessels entered, with a tonnage of 265,998; 744 cleared, tonnage, 260,957. The value of the imports in 1871 was £564,000; exports, £96,000. The pop. in 1861 was 8403; in 1871, 13,755.

BRINDLEY, JAMES, an eminent engineer and mechanic, was born at Tunsted, near Wormhill, Derbyshire, 1716; died in 1772. At seventeen he became apprentice to a millwright, and on the expiration of his indentures he commenced business as an engineer, and in 1752 displayed great talent in contriving a water-engine for draining a coal-mine. A silk-mill, which he constructed on a new plan, an improved steam-engine erected in 1756, and other works, introduced him to the patronage of the Duke of Bridgewater, then occupied in planning a communication between his estate at Worsley and the towns of Manchester and Liverpool by water. This immense work, which was ridiculed by scientific men of the period as impracticable, Brindley undertook, and by means of aqueducts over valleys, rivers, &c., he completed it between 1758 and 1761, so as to form a junction with the Mersey. This success caused him to be employed, in 1766, to unite the Trent and Mersey, upon which he commenced the Grand Trunk Canal, but dying before its completion, the work was finished, in 1777, by his brother-in-law, Mr. Henshaw. From this main branch Brindley also cut another canal near Haywood, in Staffordshire, uniting it with the Severn in the vicinity of Bewdley, and finished it in 1772. From this period scarcely any work of the kind in the kingdom was entered upon without his superintendence or advice. Among other designs, he prepared one for draining the fens in Lincolnshire and the Isle of Ely, and another for clearing the Liverpool docks of mud, which was especially successful. The variety of his inventions, and the fertility of his resources, were only equalled by the simplicity of the means with which he carried his expedients into effect. He seldom used any model or drawing, but, when any material difficulty intervened, generally retired to bed, and there meditated on the best mode of overcoming it. On such occasions he has been known to seclude himself for days. So partial was he to artificial inland navigation, that to a question humorously put to him in an examination before the House of Commons, 'For what purpose did he consider rivers to have been created?' he is said to have replied at once, 'To feed navigable canals.'

BRINE is water saturated with chloride of sodium or common salt, like the water of the ocean. It is naturally produced in many parts of the world beneath the surface of the earth, and flows out in springs, or is pumped out for the use of salt manufactories. Brine is also made artificially, for preserving meat, a little saltpetre being generally added to the solution. It appears that there is some danger in using brine in this way, after it has been kept for some months. A communication was made to the Imperial Academy of Medicine in France upon this subject, and the Council of Health in Paris, after examining into it, recommended that 'in all cases brine preserved too long, or in contact with rancid meat, should not be employed except with the greatest care, and after it has been purified by skimming all the scum which forms on the surface.'

BRING-TO, to check the course of a ship, when she is advancing, by arranging the sails in such a manner that they shall counteract each other, and prevent her from moving forward or backward. In this situation she is said to *lie to*, having some of her sails *aback*, to oppose the force of those which are full.

BRINVILLIERS, MARIE MARGUERITE D'AUBRAY, MARCHIONESS OF, born about 1630, executed 1676. She was the daughter of Dreux d'Aubray, civil-lieutenant of Paris, and married in 1651 the Marquis of Brinvilliers. The marriage at first seemed happy. Both the marquis and his wife had considerable means, and they lived with great freedom and luxury. Madame de Brinvilliers was very attractive in appearance, being little and slender; she possessed much talent and a very firm temper, but had little education. In the course of ten or eleven years they appear to have had three children. About 1659 the marquis introduced to his house a young cavalry officer, named Gaudin de Sainte-Croix, for whom his wife conceived a violent passion. The marquis, occupied with his own pleasures, seemed indifferent, and did not disturb them, but her brothers remonstrated violently, and her father, scandalized at her misconduct, had Sainte-Croix openly arrested in her carriage and taken to the Bastille in 1665. Sainte-Croix remained in prison about a year, and made there the acquaintance of an Italian named Exili, who taught him the art of preparing poisons, in which he soon excelled his instructor. On his liberation he imparted his discoveries to Madame de Brinvilliers, who was eager to turn them to account. She had in the meantime assumed the air of piety, visiting the hospitals, and ministering to the sick, and had thus reconciled herself to her family; but the affront offered her by her father remained in her mind, and she had resolved to revenge it. Sainte-Croix, apparently from cupidity, seconded her design. He supplied her with poisons, with which she experimented first on the patients in the hospital. She also appears to have tried their effects on animals, and on her domestics. She occupied eight months in administering poisons to her father, and at last killed him suddenly without being suspected. By the aid of Lachaussée, an old domestic of Sainte-Croix, whom she caused to enter their service, she also succeeded in poisoning her brothers. She is said to have attempted her husband, with a view to marry Sainte-Croix, but did not succeed, being apparently not so well seconded by her paramour, who did not care for any closer connection with her. Sainte-Croix died suddenly, it is said from the falling off of a mask of glass which he used to protect himself in preparing a subtle poison. A packet addressed to Madame Brinvilliers, containing poisons labelled with descriptions of their effects, revealed their conspiracy. Among a number of passionate letters there was also one containing a

promise of 30,000 francs, which Sainte-Croix had exacted as the price of his assistance. Madame Brinvilliers fled to Liége, and took refuge in a convent. Her extradition being obtained, she was inveigled from the convent by a pretended lover, brought to Paris, and on the evidence of Lachaussée, together with her own confession, condemned to be beheaded and afterwards burned. The marquis endeavoured in vain to procure her pardon. In her confession she admitted having killed her father, her two brothers, and one of her children, and accused herself of other horrible crimes. She is frequently alluded to in the letters of Madame de Sévigné.

BRIOUDE, a town in France, department of Haute Loire, 28 miles N.W. of Le Puy, near the left bank of the Allier, in a spacious basin, surrounded by hills. The only edifices of note are the college, and the cathedral church of St. Julian, founded in the ninth century, a specimen of the Byzantine style. The sculptures of the entrance and interior are much admired. Brioude has courts of first resort and of commerce, a communal college, an agricultural society, and a public library. It has manufactures of linen and woollen stuffs, and a trade in grain, wine, hemp, and antimony. Lafayette was a native of this town. Pop. 4932.

BRISACH, OLD, or BREISACH, a town of the grand-duchy of Baden, once included in Brisgau, formerly on the W. side of the Rhine, but, since the river changed its course, near the E. bank. Formerly a very strong place, it was taken in 1638 by the Duke of Saxe-Weimar, and bombarded by the French in 1793. New Brisach, a fortress of the first class on the W. side of the river, founded by Louis XIV. in 1690 to compensate for the loss of Old Brisach, surrendered at the Peace of Ryswick, and fortified by Vauban, is considered one of his master-pieces. Brisach was bombarded by the Germans during the late war, and surrendered 10th Nov. 1870, after a siege of a month. It is now contained in the imperial territory of Elsass-Lothringen, and is 30 miles S. of Strasburg. Pop. 3270.

BRISBANE, the capital town of the British colony of Queensland, in county Stanley, about 25 miles by water from the mouth of the river Brisbane; lat. 27° 30′ S.; lon. 153° 2′ E. It is situated on low ground, surrounded by hills, and is an elegant and well-planned town. Brisbane was originally settled, in 1825, as a penal station by Sir Thomas Brisbane. In 1842 the colony was opened to free settlers, and from that period the city has made rapid progress. The public buildings are not very numerous. The Houses of Legislature, which rank as the finest, cost £100,000; the town-hall, the post-office, the vice-regal lodge, and several churches, schools, and banks, may also be included amongst the architectural ornaments of the city. The local parliament meets in Brisbane. The climate is tropical, and subject to the humidity of the S.E. trade-winds. There is ample wharf accommodation in the port, but there is a bar at the mouth of the river which only permits vessels of a limited size to come up to the city. There is, however, regular communication by steamers with Sydney. Pop. in 1871, 19,413.

BRISBANE, GENERAL SIR THOMAS MACDOUGALL, a soldier distinguished in the Peninsular war, and also a statesman and astronomer, was born at Brisbane, near Largs, the seat of his family, 23d July, 1773; died 27th January, 1860. At the age of sixteen he entered the army as an ensign, and in 1793 he raised a company in Glasgow, and took part in all the engagements of the campaign in Flanders. In 1796 he was sent to the West Indies, where he distinguished himself by his services under Sir Ralph Abercromby. In 1812 he commanded a brigade under the Duke of Wellington in Spain. He took part in the battles of Vittoria, Orthes, and Toulouse, and received the thanks of Parliament for conspicuous bravery at the battle of the Nive. On the abdication of Napoleon he was sent to America, and did not return in time to take part in the battle of Waterloo. In 1821 he was appointed governor of New South Wales, which post he continued to occupy for four years. His administration was active and intelligent, and tended greatly to promote the prosperity of the colony. He introduced at his own expense a good breed of horses, and promoted the cultivation of the vine, as well as of sugar, cotton, and tobacco. At the same time he devoted himself with great diligence to the study of astronomy. He had an observatory erected at his residence at Paramatta, and catalogued 7385 stars, until then scarcely known to astronomers. For this great work, known as the Brisbane Catalogue of Stars, he received the Copley medal of the Royal Society, which he valued above all his military honours. On his return to Scotland he devoted himself entirely to science. He had an astronomical, and later a magnetic observatory established at his residence at Makerstoun. The observations which he made there, with the aid of able assistants, fill three large volumes of the published Transactions of the Royal Society of Edinburgh, of which he was president from the death of Sir Walter Scott. He founded two gold medals for scientific merit, one in the gift of the Royal Society, the other in that of the Society of Arts.

BRISEIS. See ACHILLES.

BRISGAU, also BREISGAU, a district of the grand-duchy of Baden, between the Rhine and the Black Forest, which, with the district of Ortenau, formerly constituted a landgraviate in the south-western part of Suabia. This is one of the most fertile parts of Germany, containing 1275 square miles, and 150,000 inhabitants. Its chief productions are corn, wine, flax, and wood. Though chiefly in possession of Austria since the fifteenth century, it was governed by its own laws. At the Peace of Luneville (1801), Austria ceded Brisgau, one of the oldest possessions of the house of Hapsburg, to the Duke of Modena, after whose death it fell to his son-in-law, the Archduke Ferdinand of Austria, as Duke of Brisgau. By the Peace of Presburg (1805) it was assigned to Baden, with the exception of a small part, and still belongs to the grand-duchy.

BRISSAC. See COSSÉ.

BRISSOT DE WARVILLE, JEAN PIERRE, a French political writer, and one of the leaders of the party of the Girondists, was born in 1754, executed 30th October, 1793. He took the name D'Ouarville, which he afterwards anglicized into De Warville, from the village of Ouarville, near Chartres, where he was born or educated. He was the son of a wealthy restaurateur, who gave him a good education, although he was his thirteenth child. He was designed for the law, and placed with a procurator in Paris; but he early turned his attention to public affairs, associating himself with such men as Pétion, Robespierre, Marat, &c. In 1780 he published his Théories des Lois Criminelles, and two years afterwards an important collection called the Bibliothèque des Lois Criminelles. During this period he also engaged in periodical literature, editing for a time, at Boulogne-sur-Mer, the Courier de l'Europe, a translation from an English journal. He also visited England, where he endeavoured to found a lyceum and establish a journal in connection with it. Failing in this enterprise, he returned to Paris, where his works had already classed him among the philanthropic theorists of the day. He was suspected of the authorship of

an anonymous pamphlet, and thrown into the Bastille. On his liberation he engaged with Clavières and Mirabeau in some works on finance, which appeared under the name of the latter. Threatened with a new arrest, he escaped to England, and being there introduced to the Society for the Abolition of Negro Slavery, he resolved to form a similar society in Paris. This society, which numbered many distinguished names among its members, and ultimately accomplished its object, he founded along with Clavières, Mirabeau, and others, and undertook a voyage to the United States to study on its behalf the problem of emancipation. On his return the revolution was about to break out, and Brissot embraced it with ardour. He was not a member of the States-general, but was elected to the National Assembly for Paris, and to the Convention for the department of the Eure et Loir. As leader of the Girondist party, his history belongs henceforward to the history of France. He voted, out of policy, for the death of Louis XVI., subject to confirmation by the vote of the people; and he caused war to be declared against Holland and England in February, 1793. This was his last political act. Until the close of his career he was engaged in defending himself against the Montagnards. Brissot was inferior to Vergniaud as an orator, but his writings exercised a powerful influence on the revolution. In the early part of his career his opinions were very extreme. In a passage which was afterwards used against him he carried his advocacy of individual rights as far as to justify not only theft, but cannibalism. Proudhon was accused of having borrowed from him the maxim, 'La propriété c'est le vol.'

BRISSOTINS, or BRISSOTISTS, a name sometimes given to the Girondists, from the subject of the preceding article.

BRISTOL, a city, a municipal and parliamentary borough, a sea-port, and a county in itself, situated on both sides of the rivers Avon and Frome, and between the counties of Somerset and Gloucester, of both of which it is independent. It lies due W. of London (lat. 51° 27′ N.; lon. 2° 35′ W.), at a distance of 120 miles by road, and 118½ by the Great Western Railway, and is 12 miles N.W. of Bath. Like ancient Rome it is seated on seven hills, or elevations, which diversify the surface of a vale, about 8 miles from the mouth of the river Avon, in the Bristol Channel, and at its confluence with the Frome. It was called *Caer Oder* by the ancient Britons, meaning a frontier city; and it is supposed to be noticed both by Gildas in the fifth and Nennius in the seventh century as one of the fortified cities of Britain. By the Saxons it was called Brightstowe, signifying a pleasant place, whence its present denomination; and it is first unequivocally recognized by history in the reign of Athelstan. Its situation always rendered it commercial, according to the nature of the times; and in the eleventh century it is said that a mart was held here for the sale of English slaves of both sexes—a practice which, to the discredit of Christianity and humanity, then prevailed. It was encompassed with a wall by Robert, earl of Gloucester, the illegitimate son of Henry I.; and the same able nobleman erected a strong castle, in which his nephew, Henry II., was partly educated. It received a partial charter from the latter monarch, which was confirmed and extended by John and Henry III. In the reign of Edward II. Bristol rebelled against the royal authority, and was held by the citizens against the sovereign for a period of four years. The burgesses built a strong wall with forts for protection against the castle, and the town continued under the government of the municipal authorities. Edward III. constituted it a city and county in itself in 1373, and Henry VIII. made it the seat of a bishopric in 1542. Its privileges were still more extended by the charters of Elizabeth and Charles I. Bristol was the scene of many interesting events during the civil wars of England. It was maintained for the Parliament during the reign of Charles I., but was stormed and taken by the Royalists under Prince Rupert. It was, however, retaken after the battle of Naseby by General Fairfax, and its formidable castle razed to the ground by order of Cromwell. On the Restoration it received a new charter from Charles II., which was confirmed by Queen Anne, and is that under which the city is at present governed. In 1831 Bristol was the scene of a series of frightful riots, occasioned by the reform agitation, which lasted for several days. Several buildings were burned and lives lost. An industrial exhibition was held at Bristol in 1865.

The entire city, with its suburban districts, Clifton, Westbury, Montpelier, St. Philip and St. Jacob Out, and Bedminster, are included within the parliamentary and municipal borough, and comprise an area, which is being constantly expanded, of about 2000 acres, contained within a circumference of 9 miles. The old town, which now forms the heart of the city, stands upon a narrow hill, bounded by the Avon on the S., the Frome on the N. and W., and by the moat of the castle, now nearly arched over, on the E. Of the eminences on which the city stands, the highest are St. Michael's Hill and Kingsdown, which are 200 feet above the lower parts of the town. At one time the ascent and descent were very inconvenient, but latterly they have been greatly improved. The more ancient streets are narrow, with lofty houses of wood and plaster, the fronts of which formerly projected to the exclusion of light and air; but of late years most of these have been widened and improved, and more particularly the avenues to the bridges. The buildings in the more modern parts of the town are elegant and spacious, and Kingsdown and St. Michael's Hill on the N., Park Street and Berkeley Square on the W., and Redcliffe Hill on the S., are covered with handsome houses, which are chiefly inhabited by the gentry and mercantile classes. But for a long time the principal inhabitants have been moving towards Clifton, which, in point of fact, is now become the 'west end of the town.' Bristol is well supplied with water from the river Chew and the Barrow Springs, and great improvements have, in recent years, been effected in cleansing and sewage. By these means it has been made one of the healthiest among the large towns of England, while formerly it was among the most unhealthy.

The quay and harbour of Bristol may be deemed objects not only of great local but of national interest. The former is an uninterrupted wharf of hewn stone, upwards of a mile in length, extending along the inner shores of the Frome and Avon. Although, owing to the depth and rapidity of the Avon, vessels of 1000 tons burden could always reach the quay at spring-tides, they frequently sustained damage by being aground at low water, and were delayed by the necessity of waiting for spring-tides to get out again. To remedy these inconveniences a floating harbour was completed in 1809, by damming up the bed of the Avon and Frome, so far as the Hot-wells, and cutting a new channel for the Avon from near Totterdown to Rownham Ferry. This is supposed to have cost half a million sterling, but it has been amply repaid, as it has formed a harbour capable of accommodating 1000 vessels, which are not only kept afloat, but are enabled to proceed to sea at any time. On changing the course of the Avon two handsome cast-iron bridges were erected over the new channel: there is also a fine suspension bridge at Clifton. The dock accommodation has been recently improved

and extended, and the passage of ships up the Avon facilitated by the blasting away of rocks. A mile below the city, on the banks of the Avon, is the celebrated Hot-well, the waters of which are reckoned very salutary in consumptive, scorbutic, and inflammatory disorders. The reputation of the spring has long rendered the vicinity the resort of invalids during the summer, and gradually produced the usual accommodation appertaining to places of a similar description. It is determined by analysis that the mineral contents of the Bristol waters are like those of Matlock: the principal components are, a considerable quantity of carbonic acid gas and a portion of calcium and magnesium in various combinations with the hydrochloric, sulphuric, and carbonic acids. Its temperature at the pump is between 72° and 73° of Fahrenheit. The spring rises near the bottom of the cliff, 10 feet below water-mark, and gushes so plenteously from an aperture in the solid rock as to discharge 60 gallons in a minute. At the time of the earthquake in Lisbon, in 1755, the water of the spring became red and turbid, the tide of the Avon flowed back, and the water in the vicinity turned black, and was unfit for use for a fortnight.

The public buildings of Bristol are numerous and handsome. It contains a cathedral, and about 150 churches, chapels, &c. The cathedral, a fine specimen of early English architecture, was founded in 1142, partially rebuilt between 1306 and 1515, and restored 1861. There are several other fine old churches, but they are all excelled by that of St. Mary Redcliffe, which is deemed one of the most beautiful in England. It was begun in 1294 by Simon de Burton, mayor of Bristol, but not completed until 1376. It was much damaged and the steeple thrown down by lightning, which damage was repaired by William Canynge or Canning, five times mayor of Bristol, whose name stands so conspicuous in the Chatterton controversy. It is built in the form of a cross, having a nave raised above the aisles in the manner of a cathedral. The western door is the principal entrance, but there are porches to the northern and southern sides of the church, the interior of the former of which is extremely beautiful. It was over this porch that the muniment room was situated, in which Chatterton, whose father was sexton of the church, pretended to find the poems which he attributed to Rowley. The lightness and symmetry of the interior are universally admired, and the altar is decorated with Scriptural pieces by Tresham and Hogarth. Here are monuments to the memory of William Canynge, the restorer of this beautiful edifice, and of Admiral Sir William Penn, father of the celebrated founder of Pennsylvania. A restoration of this fine church was begun in 1870. Among other public buildings are the exchange, erected in 1760; the new guildhall, in 1846; and the various banks, hospitals, literary and charitable institutions. The establishments for gratuitous education are very numerous, including the city grammar-school, which possesses five exhibitions and two fellowships at Oxford; the endowed college-school, founded by Henry VIII.; the grammar-school of Queen Elizabeth, which educates 200 boys, all of whom, on leaving, receive a sum to assist to bind them apprentices. An hospital, founded by Edward Colston, merchant, in 1708, has also a school annexed, in which 100 boys are educated, maintained seven years, and then apprenticed. There are several minor endowed schools, for children of both sexes, besides a great number of more modern origin, which are supported by subscription; including a Baptist theological college, National, Lancasterian, adult, Sunday, and every description of charity schools. The donations and bequests to the poor, both in and out of the gift of the corporation, possibly exceed in number and amount those of any place in England, except London. The charities and establishments for relief of poverty, disease, and destitution, are in due proportion. Among these the most remarkable is the asylum at Ashley Down, for the orphans of Protestant parents. The buildings, erected between 1847 and 1868, at a cost of £110,000, occupy several acres, and accommodate 2050 children. This immense establishment is under the superintendence of the Rev. George Müller, by whom it was originated and gradually developed to its present extent. The annual expenditure, which is now about £20,000, is provided for by voluntary contributions and gifts of every imaginable kind, which are received from all parts of the world. Bristol has a public library of considerable magnitude, a theatre, and a philosophical and literary institution, which possesses a valuable museum of natural history, with mineralogical and geological specimens.

Bristol has numerous glass-works and potteries, and has long been famous for glass and pottery ware. It has also brass, copper, zinc, iron, and tin works; engineering is conducted in various branches, and ship-building, both in iron and wood, is carried on to a considerable extent. Sugar refineries, breweries, distilleries, chemical works, and other manufactories, among which that of tobacco and snuff occupies a considerable place, also exist. Until eclipsed by Liverpool it was the principal port on the western coast of England. Its principal commerce is with the West Indies, the Mauritius, Havana, Venezuela, the East Indies, China, Canada, the United States, various European ports, and the African coast of the Mediterranean. The heavy dues exacted by the dock company impeded the expansion of the commerce of Bristol for some time after the establishment of the floating harbour, but in 1848 the dues were reduced and the trade has since improved considerably. In 1871 1073 vessels were entered inwards from foreign and colonial ports, with a tonnage of 356,183; and 8426 vessels coastwise, with a tonnage of 634,997. The vessels cleared the same year were, for foreign and colonial ports, 363; tonnage, 120,504: coastwise, 4545; tonnage, 453,013. The customs revenue for 1871 was £878,621.

William Grocyne, an eminent Greek professor at Oxford; William Botoner, who first translated any portion of Cicero into English, and was an antiquary of considerable industry; the celebrated mariner, Sebastian Cabot, son of a resident Venetian—all living in the fourteenth and fifteenth centuries; the ill-fated Chatterton, whose early and melancholy end is well known, were natives of Bristol. To these may be added Bowditch, the African traveller, and the poet Southey. Pop. in 1861, 154,093; 1871, 182,552.

BRISTOL, a sea-port town, and capital of a county of the same name, in Rhode Island, United States, 56 miles s.s.w. Boston. Pop. in 1870, 5302. It is a very pleasant town, finely situated, and handsomely built; has a safe and commodious harbour, and is a place of considerable trade. The trade is chiefly to the West Indies and to Europe. This place is a favourite summer residence with those requiring fresh sea air.

BRISTOL CHANNEL, an arm of the Irish Sea, extending between the southern shores of Wales and the western peninsula of England, and terminating in the estuary of the Severn. It is about 90 miles long, and from 15 to 50 miles wide. It is remarkable for its high tides and the rapidity with which they rise. At Chepstow spring-tides rise as high as 60 feet. On its coast are situated the towns of Swansea, Ilfracombe, Tenby, &c.

BRITAIN, or rather BRITANNIA, was the name which the Romans gave to modern England and Scotland. According to the testimony of Pliny and Aristotle, the island in the remotest times also bore the name of *Albion*. The sea by which Britain is surrounded was generally called the *Western*, the *Atlantic*, or *Hesperian Ocean*. Until the time of Cæsar Britain was never visited by the Romans. But the Phœnicians, Greeks, and Carthaginians, especially the first, were acquainted with it from the earliest period, being accustomed to obtain tin here. Cæsar undertook two expeditions to Britain. He defeated the inhabitants, whom he found entirely savage, and continued a short time on the island. At this time the country was very populous. It was not, however, until the time of Claudius that the Romans gained a firm footing here. At that period they extended their possessions in the country, and called the territory under their dominion *Britannia Romana*, the remainder being called *Britannia Barbara*. The most important acquisitions were afterwards made under Hadrian and Constantine. At last the inhabitants assumed the manners of their conquerors. The Romans, from the time of Hadrian, anxiously endeavoured to secure the former against the invasions of the barbarians, by a wall or rampart of earth fortified with turrets and bulwarks. Lollius Urbicus, in the reign of Antoninus, built another wall further N.; but Septimius Severus restored the Roman province of Britain to its former limits. In his time the Roman province was divided into the two provinces, *Britannia Superior* and *Britannia Inferior*. It was afterwards divided into four provinces (probably in the reign of Diocletian or in that of Constantine), to which a fifth was added in 369. The names of these provinces were *Maxima Cæsariensis*, *Flavia Cæsariensis*, *Britannia Prima*, *Britannia Secunda*, and *Valentia*. The inhabitants of ancient Britain derived their origin partly from an original Colony of Celtæ, partly from a mixed body of Gauls and Germans. The Celtic colonists, or the Britains properly so called, living in the interior of the country, had less intercourse with foreign merchants than the Gauls, who lived along the coasts. They are therefore represented by the Romans as less civilized. The Gallic inhabitants, who had settled nearer the sea-coast, possessed some property, and were therefore more easily intimidated than those tribes that were dispersed through the forests. The coast tribes cultivated the ground: the inland tribes lived by raising cattle and hunting. Their dress consisted of skins. Their habitations were huts made of wicker-work and covered with rushes. Their priests, the Druids, together with the sacred women, exercised a kind of authority over them.

History of Great Britain.—The name Great Britain was applied to England and Scotland after James I. ascended the English throne in 1603, and we shall here give an outline of the history of the United Kingdom from that period. Under the articles ENGLAND, SCOTLAND and IRELAND, the histories of the respective countries will be found.

With Elizabeth, who died in 1603, ended the line of princes of the house of Tudor. James VI. of Scotland, son of the unfortunate Mary, was the only near relation of Elizabeth (his great-grandmother, Margaret, was daughter of Henry VII. of England, grandfather of Elizabeth), and was named by her a short time before her death as her successor on the English throne. James was acknowledged without opposition; and thus two countries which had lived for ages in strife and bloodshed with each other, were amicably linked together.

James was not entirely destitute of natural abilities, and had acquired a more than ordinary share of literary knowledge, for which he was indebted to the celebrated George Buchanan. When he ascended the throne of England, the tyranny of the Episcopalians, the opposition of the Catholics, and the discontent of the Puritans had kept the nation in continual fermentation; for the successes of Elizabeth's reign only disguised the severities of her internal government. The Catholics expected a toleration from a prince who was born of Roman Catholic parents, baptized with the rites and ceremonies of the Church of Rome, and whose royal mother had died a martyr for the cause. The Puritans, on the other hand, expected that a monarch bred up in Presbyterian principles, and an attachment to which he had publicly manifested upon several occasions would rid them of their oppressors, and cast the balance in their favour; while the bishops awaited his accession with fear and trembling. But James soon disappointed the fears of the one, and the hopes and expectations of the other parties. Dissimulation was a leading feature of his character, and a desire of unlimited power and authority the reigning passion of his heart, but which he had carefully concealed while he reigned in Scotland. Instead of moderating, he increased the power of the Episcopal hierarchy; and the Catholics were so provoked at the disappointment of their expectations of a toleration at least, if not an establishment, that they formed a plot for the purpose of cutting off, not only the king and his ministers, but the whole of his Parliament. This conspiracy, well known by the name of the Gunpowder Plot, was happily prevented, and the principal conspirators suffered that punishment which they had so justly merited.

England and Scotland were now ruled by the same prince, and James wished to make the union still more complete; but national animosities were not yet sufficiently extinguished, and national prejudices were too prevalent. It was James' misfortune that he had imbibed exalted notions of the royal prerogative, and wished to govern by the arbitrary maxims that had distinguished Queen Elizabeth; the glories of whose reign were, in the eyes of her subjects, some atonement for her occasional acts of despotism. But the nation, in consequence of the progress of political and religious knowledge, and the increasing diffusion of commercial wealth and prosperity through the whole community, was beginning to question the divine right of kings, and to wish for an extension of popular privileges. His whole reign was therefore a continued contest between the prerogative of the crown and the freedom of the people. The Parliament refused to give supplies to a prince who was always reminding them of his prerogative: and who at the same time was destitute of vigour to enforce his pretentions. Accustomed as James had been, while he swayed the Scottish sceptre, to support the splendours of regal dignity upon a very slender revenue, it was reasonable to expect that when he ascended the English throne that frugality would have been a marked feature of his conduct; but his behaviour disappointed these expectations. Careful, though indeed from a constitutional timidity of character, to avoid wars, his system was entirely pacific during the whole course of his reign; yet his profusion was such that it uniformly exceeded his income; for he kept up three courts, one for himself, one for his queen, and a third for his son. The expense of his daughter's marriage to the elector palatine, cost, including her portion, £93,278: and not content with bestowing upon his favourites the most lucrative offices of the state, and considerable grants from the royal domains, he lavished upon them large sums of money. In the first fourteen years of his reign, £424,467 were thus expended. He bestowed

upon his eldest son, Henry, prince of Wales, a clear revenue of £51,000; a sum equivalent in value to £150,000 of our modern money. During his whole reign Ireland continued to be a heavy load upon England, occasioning large sums of money to be constantly remitted to support a standing army, which at one time amounted to 19,000 men; as also to supply the deficiencies of the Irish treasury. His wants, occasioned by his profusion, kept him engaged in constant disputes with his Parliament, who would not grant him money equal to his demands, and compelled him to resort to monopolies, loans, benevolences, and other illegal methods. Among other expedients he sold the titles of baron, viscount, and earl, at the rates of from £10,000 to £15,000, and sometimes even £20,000. In his reign the hereditary title of baronet first originated. In 1611 ninety-three baronets were created, the sale of whose patents produced £98,550, or £1095 each. Of the £800,000 which Holland owed to Elizabeth, James was content to take the one-half, and surrendered up the cautionary towns for a fourth of their value; and suffered the Dutch to dispossess the English of their factories in the East Indies. He also meanly consented to accept of £60,000, instead of £300,000, which Elizabeth had lent to Henry IV. of France: and in order to gratify the Spanish court he sacrificed the brave Sir Walter Raleigh. His ambition was more to shine as a theologian than a prince; and in 1617 he attempted to establish Episcopacy in Scotland, but was baffled in his design by the firmness of the people. In fine, though the nation undoubtedly prospered in wealth and commerce, yet his reign was inglorious; and he died disliked by the majority of his subjects, in 1625, after a reign of twenty-two years over England, without having performed one great or glorious deed to exalt his own character or that of the nation.

His son Charles, who succeeded, inherited the same exalted notions of royal prerogative; accompanied with a stiff and perverse temper, and a reserved and distant behaviour, which he had increased while he was in Spain. Equally with his father he was addicted to favouritism. His unhappy marriage with a Popish princess, his servile fondness for his queen, and his resolute adherence to arbitrary maxims and illegal methods of raising money without consent of his Parliament, gradually widened the breach between him and his subjects. His government grew more unpopular daily, and the Commons would vote no supplies without redress of grievances; which, instead of diminishing or complying with the wishes of his Parliament, and thereby soothing them into a more submissive temper, he constantly augmented, by proceeding from bad to worse: dissolving Parliaments, imprisoning members, and raising prosecutions in the Star-chamber against the most popular characters in the kingdom. He intrusted the keeping of his conscience entirely to Laud, a complete bigot in church and state; who, in conjunction with Wentworth, earl of Strafford, entangled him in a most expensive and disastrous contest with his Scottish subjects, and afterwards with his Parliament, encouraged by the successful resistance which the Scots had made to arbitrary power. The success at first was various; but the king was destitute of money to pay his troops, while the Parliament had at their disposal the whole wealth of the nation. Charles was at last involved in such distress that he fled for protection to the Scottish army, which, in conjunction with the Parliament, maintained the struggle against arbitrary power. There he endeavoured, by various machinations, to sow dissension between them and the English Parliament, and to engage them in his interest, but entirely failed in the attempt. The Scots had no intention of involving themselves in a war for the sake of a prince who had forfeited all confidence by keeping his word no longer than it suited his convenience, and therefore delivered him up to the Parliamentarian commissioners.

One part of the Parliament and of the nation were of opinion that now the constitution ought to be rectified; that the limits between the prerogatives of the king and the privileges of the people ought to be accurately determined; that after such salutary regulations the king ought to be restored to his throne, and to that share of power which was consistent with the happiness of his subjects; and that all past transactions ought to be buried in oblivion. But the Parliamentary army had reduced the king to subjection, and the leaders of the army fancied that, were he removed, the sovereign power would immediately fall into their own hands. Cromwell, equally noted for the dexterity, the vigour, and success of his conduct, acquired an influence that nothing could resist. Under his guidance the army loudly declared for a commonwealth, and for the trial of the king, the invader of his people's rights. The king was tried; as might have been foreseen, he was condemned, and on the 30th of January, 1649, was beheaded before his own palace.

Cromwell's power in the army, and consequently in the nation, was supreme. The success of his schemes had perhaps exceeded his own expectation. He was dazzled with the splendour of a high station, pleased with the exertion of authority, and consequently unwilling to abandon that which he had so successfully acquired. The king had fallen before him; nothing remained but to annihilate the Parliament. This to Cromwell was no difficult undertaking. He went at the head of a chosen party of soldiers to the place where they were assembled, told them that 'the Lord had no more occasion for them,' turned them out of the house, and carried the keys along with him.

Had Cromwell assumed the title of king perhaps all his abilities might not have been able to withstand the fury of the party by which the very name of king was abhorred; but he had too much knowledge of human nature not to perceive that words have the greatest influence in the conduct of men. He knew he had the power of a king, and he was content with the name of a protector. Under this appellation he exercised a more unlimited authority than had ever been exercised by any of the English monarchs. During the whole of his administration Cromwell retained that vigour and decision which had characterized him throughout the Parliamentary wars. He formed no system of politics by which he might regulate his transactions with foreign nations; but the promptitude of his measures, and the terror of his fleets and armies, rendered him no less respected abroad than he was at home. After a short reign, during which he endured all the miseries of grandeur and the anxieties of distrust, he died in 1658. Cromwell had so firmly established his authority that his son Richard was called to assume the authority of the protector; but Richard's temper was totally unlike that of his father. He preferred the calm of private life to the turbulence of power and the cares of ambition. The Republican party soon perceived that Richard could not, like his father, render himself dreadful to them. They began, therefore, to resume the power which they had formerly possessed; and to introduce that anarchy by which the nation had formerly been convulsed. In such revolutions the opinion of the people at large is seldom consulted. Harassed by commotions which had long prevailed, the nation hated equally the

tyranny of a protector and the anarchy of a pretended republic. The restoration of their old constitution, and of their former race of monarchs, was the general desire. Taking advantage of this prevalent disposition, General Monk, who had commanded under Cromwell, and who was now at the head of a considerable force, formed the resolution of restoring Charles, son of Charles I. Monk was compelled to temporize, lest the Republicans should suspect his designs; but such was the caution with which he took his measures, and such the general disposition of the nation, that in 1660 Charles was recalled and placed on the throne, under the name of Charles II. In the measures of a crowd there is seldom moderation; and such on this occasion was the enthusiasm of loyalty that the king was restored to the throne without any restraint upon his authority, and without any attempt to define the prerogatives of the crown and the privileges of the people.

Charles II. seems to have profited little by his father's misfortunes. More attached to the pleasures of life than anxious faithfully to discharge the duties of his office, he appears to have considered sovereignty chiefly as an acquisition by which he could, with more ease, indulge himself in licentiousness and profligacy. Had the House of Commons been sufficiently liberal in their grants, and not very scrupulous in demanding an account of the manner in which these grants were expended, Charles would, perhaps, have permitted them to conduct the affairs of the nation in the way most agreeable to themselves. But the Commons were parsimonious. The king, resolved on satisfying every passion, scrupled not in order to obtain money to adopt the most illegal measures. The Parliament began once more to express that jealousy of the kingly prerogatives which had formerly involved the nation in so much confusion. The king continually demanded supplies; the Parliament answered him by remonstrances regarding his conduct. The Duke of York, brother to the king, and heir-presumptive to the crown, had openly declared himself a Roman Catholic, a circumstance than which nothing could more excite the national terror. The Commons persisted in withholding supplies; the king became daily more needy, more peevish, and less scrupulous in his conduct; and at length, perceiving that he was to expect from his Parliament only reproaches, he dismissed it, resolving never to assemble another; and from that moment managed the reins of government in a manner altogether arbitrary.

The English, and indeed every nation of Europe at this time, seem to have been anxious to humble the growing power of France; but in this respect the opinion of Charles was different from that of his people. The French monarch supplied Charles with money, of which he was continually in want, and thus engaged him in hostilities with Holland. The naval power of the Dutch was at that time truly formidable. Only the English could pretend to rival them at sea. Many engagements were fought with uncommon obstinacy and consummate skill; and though the Dutch, seizing a favourable opportunity, sailed up the Thames and insulted their enemy in her own harbours, the naval strength of the English was gradually acquiring an irresistible superiority, and establishing that power which has since become altogether unequalled.

Charles died February 6, 1685, and as he left no lawful issue, his brother, the Duke of York, succeeded to the throne, under the name of James II. During the life of Charles, James had always asserted the doctrine of passive obedience; and that he might the more evince his sincerity, he practised in his life that doctrine of which he inculcated the belief. What he so willingly had yielded to his sovereign he hoped his subjects would have no aversion to yield to himself; and he proceeded to act with all the perverse obstinacy of a narrow mind. To render himself still more odious he exerted that power which he pretended to be unlimited in a design than which no other could be more generally abhorred: he laboured to establish in his dominions the Catholic faith. His design was opposed with a vigour which ought to have convinced him that it was impracticable; but opposition served only to exasperate his measures and to render him more obstinate. Matters soon came to such a situation that it was evident that the monarch intended to establish Popery at the risk of his own ruin. In this extremity the nation turned their eyes to William, prince of Orange, celebrated for his military capacity and his political virtues. Though this prince was nephew, as well as son-in-law to James, he eagerly accepted an invitation to enter the kingdom for the purposes of relieving the people from their apprehensions of Popery, and bringing the infatuated monarch to a more reasonable mode of action. No sooner had William landed than James was deserted by almost all his remaining adherents. Forgetting that bravery which he had exhibited when Duke of York, in his engagements with the Dutch, he resolved, according to the advice of some who pretended to be his friends, to leave the kingdom. He fled to France. The throne was declared vacant. After some debates the Prince of Orange and his wife, the Princess Mary, were called to be the King and Queen of England. The people, convinced by the transactions of their preceding monarchs that the surest way of securing the peace of the nation was to define the power of the prince and the privileges of his subjects, adopted a mode of conduct which ought to have been followed at the Restoration. They framed the Bill of Rights, which fixed the English government in that state of freedom and moderation which has since so happily characterized it. This important revolution was effected in 1688.

Though the revolution had been brought about with much appearance of unanimity, and though it secured to the nation inestimable privileges, the government of William was not in general agreeable, nor had James lost all his friends. In Ireland particularly, as it abounded in Catholics, that unfortunate monarch had many adherents. James appeared among them in person, and was soon at the head of an army, but William, by gaining the battle of the Boyne, annihilated James' hope of restoration. William prosecuted hostilities with France, with various success, till the battle of La Hogue made an impression on the French navy which it could never afterwards recover. The English had defined the privileges of their kings; but they found that war could not be conducted without more money than they were willing to grant: what the king could not procure as a gift he borrowed; and at this time the funding system began to be considered as a national resource —a system which the British ministers have been careful not to forget.

After a reign in very few respects remarkable, William, in 1702, was succeeded by Anne, princess of Denmark, and the next Protestant heir to James II. Anne's administration was distinguished by the violent animosities of the existing factions; but in the midst of these an important measure was passed — the union of England and Scotland. These countries had since the time of James I. been governed by a single sovereign; but they had separate Parliaments, and indeed might still justly be called separate and independent kingdoms. It had often been proposed by a union, to consolidate the power of the island

but every proposal for that purpose had hitherto been unsuccessful. This measure, of so much importance to each of the countries, was resumed by Anne; and after a violent opposition, particularly by the Scots themselves, the English and Scots were, in contradiction to the decided opinion of a majority of the latter, declared to be one people. Thus, in 1707, England and Scotland ceased to be distinct kingdoms; and the island was distinguished by the appellation of the United Kingdom of Great Britain. This union, however it might be opposed by the prejudices, and even by the immediate interests of particular men or particular ranks of men, when it was first effected, has certainly contributed much to the prosperity of the empire. Britain has thus attained an importance at which England and Scotland, while separate kingdoms, could never have arrived. The Act of Union consisted of twenty-five articles, among which the following deserve notice. It was agreed that the succession to the kingdom of Great Britain should remain as it had formerly been settled for England. That Britain should have only one Parliament; and that all rights and privileges should be common to both nations, except where otherwise expressly agreed. That in all parts of Britain the English coins, weights, and measures should be considered as the standards. That the laws relating to trade, customs, and excise should be the same in both parts of the kingdom. That to the House of Peers the Scots should send sixteen representatives; and that the number of the Scottish members in the House of Commons should be forty-five. That all the Scottish peers should be peers of Britain; and that, except sitting in the House of Lords and voting on the trial of a peer, they should have all the privileges of peers. That the Established Churches of England and Scotland should remain unaltered, and be considered as forming an essential part of the union. A general clause reserved to the united Parliament the power to alter these articles for the benefit of Scotland; and under cover of this clause some fundamental changes were afterwards made. Though the union of England with Scotland tended ultimately to increase the power and importance of both, yet it was not immediately followed by any important result. The measures of the nation, both in foreign and domestic policy, continued in a great degree unaltered.

The British arms, under the command of Marlborough, had succeeded in checking the ambitious designs of Louis XIV.; but a party at home, instigated partly by envy at the renown which Marlborough had acquired, partly by considerations of the inutility of all continental conquests, and of the immense taxes which the acquisition of such empty celebrity brought upon the nation, and irritated too by the evident coldness of the continental powers in a quarrel which was properly their own, loudly demanded peace, and steadfastly counteracted all the designs of Marlborough and his friends. Harley and Bolingbroke at last succeeded in supplanting him in the favour of the queen. The command of the army was taken from him, and given to the Duke of Ormond; and after many negotiations at Utrecht, a treaty was signed by the belligerent powers on the 31st of March, 1713. By this treaty the British right of sovereignty over Hudson's Bay, Newfoundland, Nova Scotia, Minorca, and Gibraltar was acknowledged. The peace which had just been concluded was extolled by the Tories in the most unqualified terms; whilst by the Whigs it was censured in terms no less unqualified. The remainder of Anne's reign was distracted by the never-ending altercations of domestic parties. She died on the 1st of August, 1714; and with her ended the line of the Stuarts, who had swayed the sceptre of England 112, and that of Scotland 343 years.

It has been supposed by some that Anne intended to have used her influence in altering the line of succession; but either she had formed no such design, or she had not abilities to carry it into effect. At her death George I., elector of Hanover, maternally descended from Elizabeth, daughter of James I., according to the Act of Settlement, ascended the throne of Britain. The Whigs under this prince regained that superiority in the national councils of which they had long been deprived. George was greatly attached to his paternal continental dominions, and in the struggle of the two factions was often accused by the Tories of sacrificing the interests of Britain to those of Hanover. The suspension of the Habeas Corpus Act, and some other extreme measures, increased the irritation of the weaker party, and in 1715 the standard of rebellion was erected in the Highlands of Scotland by the Earl of Mar, who proclaimed the Chevalier St. George, the heir of the family of Stuart, king. A few persons in the N. of England, under the Earl of Derwentwater, joined in the same design, and proclaimed the Pretender at Morpeth and Alnwick; but the attempt was feebly conducted, and tended only to the ruin of those who had engaged themselves in so hopeless an undertaking. The Duke of Argyle in the N., and General Willes in the S., dispersed the forces of the rebels; and the Chevalier, accompanied by Mar, Drummond, and a few other persons of distinction, made their escape to the Continent.

In 1718 an alliance, known by the name of the Quadruple Alliance, was formed between Britain, France, Germany, and Holland; and of this alliance a rupture with Spain was the immediate consequence. In 1718 Sir George Byng engaged and captured the Spanish fleet in the Mediterranean. The Spaniards endeavoured to retaliate by despatching a powerful armament to support the claims of the Pretender in Britain. But the fleet was entirely dispersed by a storm off Cape Finisterre; and the Earls Marischal and Seaforth, and the Marquis of Tullibardine, who had been landed in Scotland, with difficulty made their escape again to the Continent. In 1720 the Irish Parliament was deprived of its right of final jurisdiction, and thus rendered dependent on that of Britain. In the same year the South Sea Company obtained an act to increase their capital by redeeming the public debts. The greater part of the nation now became stock-jobbers, and South Sea stock rose to £1000 per cent. This extraordinary rise was followed by an equally sudden depression; the shares fell to 150 per cent., and many families were ruined by their connection with the scheme. The Parliament, which met in 1722, had its attention engrossed by new reports of real or pretended plots in favour of the Pretender. Layer, a young templar, was convicted and executed, and Atterbury, bishop of Rochester, banished on the charge of being connected with this conspiracy. Hosier's unfortunate expedition to the West Indies to intercept the Spanish galleons was one of the last events of George's reign. He died at Osnabrück on the 11th of June, 1727, in the sixty-eighth year of his age.

George II. inherited his father's partiality for his continental dominions as well as his crown. He continued Sir Robert Walpole, who had been minister to his father, at the head of the treasury. The British monarchs had now learned to act on principles of policy different from those of their predecessors. They were now convinced that to oppose openly the will of Parliament was to plunge themselves into inevitable destruction. Instead, therefore, of opposing the House of Commons, they now endeavoured

by every means to procure in that assembly a majority favourable to their designs. Walpole is said to have been the first minister who resorted to the employment of undue influence in elections. But whatever were the means which he used, he successfully engaged the nation in all the schemes of their sovereign. It was soon discovered, however, by the other nations of Europe, that the British minister would sacrifice almost every interest to his attachment to peace; and under this impression of his character the arms of Britain, formerly so much dreaded, were now treated with something that approached to contempt. Walpole, like every man in power, had many enemies; and this part of his conduct was eagerly seized to degrade the minister in the opinion of the public. The failure of an attempt on Carthagena, together with other unfortunate naval operations, completed Walpole's disgrace. And in the meantime the Prince of Wales, having differed with his father, and consequently with the minister, became the leader of the opposition. The minority, animated by so illustrious a leader, acquired new boldness; the election of a new Parliament approached, and the influence of the prince filled it with Walpole's enemies. Unable longer to maintain his ground, the minister resigned; and as a reward of his services was created Earl of Orford. But the succeeding administration following the steps of its predecessor, became equally unpopular.

The German Empire at this time was involved in many troubles. By a treaty between several of the continental powers known by the name of the Pragmatic Sanction, the succession to the whole of Charles' dominions had been insured to his daughter; but the treaties of princes are binding only while they are supported by the force which made them. The emperor was no sooner dead than different parts of his dominions were seized by the surrounding potentates, and in a short time the whole German territory was a scene of warlike tumult. In these commotions there was nothing materially to interest Britain; but Hanover was threatened, and the British monarch was anxious to rescue from the danger of invasion his paternal dominions. A numerous army was therefore equipped for an expedition to the Continent; and George, among whose faults cowardice could not be numbered, having put himself at its head, encountered the French at Dettingen, and obtained a complete victory. France now threatened Britain with a new invasion in favour of the Pretender; but Sir John Norris, with a superior fleet, kept their armament in check. The battle of Fontenoy decided the French preponderance on the Continent; but Admirals Rowley and Warren supported the honours of the British flag at sea.

A fresh attempt was now made to restore the Stuart family to the throne of Britain. Charles Edward, son of the Pretender, having been furnished by France with a small supply of money and arms, landed on the coast of Lochaber, in the Western Highlands, in 1745, accompanied by the Marquis of Tullibardine, Sir John Macdonald, Sir Thomas Sheridan, and other adventurers. Marching southwards with 1500 Highlanders, he caused his father, then resident in Rome, to be proclaimed king at Perth. His force increasing as he advanced, he entered Edinburgh without opposition; and having defeated Sir John Cope, near Prestonpans, marched into England, accompanied by the Earl of Kilmarnock, Lords Elcho, Balmerino, Ogilvy, and Pitsligo, and the eldest son of Lord Lovat. Having taken the town and castle of Carlisle, he advanced through Lancaster, Preston, and Manchester, to Derby, within 100 miles of London; but finding himself disappointed of expected succours from France, and the English Tories, contrary to his expectations, keeping aloof, he commenced his retreat into Scotland, closely pursued by the king's troops, whom he again defeated at Falkirk. With this victory his good fortune terminated. The Duke of Cumberland having arrived from the Continent—where he had gained considerable military experience—put himself at the head of the forces which were destined to check the rebels; and the armies having met at Culloden, near Inverness, Charles was completely defeated. The fugitive prince, after lurking for six months amidst the wilds of Inverness-shire, and trusting his life to the fidelity of numerous individuals, at length, with much difficulty, escaped with Cameron of Lochiel in a vessel which his friends had hired for the purpose. The abolition of the heritable jurisdictions in 1748 laid a solid foundation for the civilization and improvement of the Highlands.

The war on the Continent, in the meantime, continued with undiminished fury. The success was various; but the British and their allies—of whom some were unwillingly engaged in the contest—were generally unfortunate. The success of the British at sea, however, compensated for their disasters on land; for though Boscawen, in the East Indies, failed in performing what was expected of him, yet Hawke, Anson, and several other naval officers, reduced the French navy to a degree of extreme insignificance. Both parties, however, had reason to desire peace. A negotiation to this effect was opened, and in 1748 a peace was concluded at Aix-la-Chapelle, the basis of which was a general restitution of conquests. Pelham, who continued to be the chief person in administration, and who enjoyed an uncommon share of popularity, showed himself worthy of the national support, by adopting and encouraging every scheme which could forward the national prosperity. Under his administration trade acquired a vigour which it had never formerly attained; and notwithstanding the enormous expense which had been incurred in the war just terminated, and the consequent accumulation of the national debt, the credit of government had not been injured. On the contrary, Pelham succeeded in reducing the interest of the public debt from 4 per cent., first to 3½, and afterwards to 3 per cent. The colonization of Nova Scotia, and the alteration of the style according to the Gregorian calendar, by merging the eleven days between the 3d and 14th of September, 1752, were among the most remarkable events which took place during the short interval of peace. At the same time the 1st of January was fixed as the opening day of the year, instead of the 25th of March, which, being the first day of the ecclesiastical year, was up to this time considered by many as New-Year's Day.

To diminish the trade of Britain now became one of the chief aims of her continental adversaries, in order to enable them to renew the war with a greater probability of entire success. But the great object of the French was to straiten the boundaries of the British colonies, and, if possible, either to wrest them from the mother country, or to involve them in unavoidable ruin. With a view to the execution of this purpose, the French used every art to ingratiate themselves with those Indian tribes by which the British settlements in America were surrounded. Animosities which in some cases were already excited, and for which there existed plausible reasons, were inflamed into implacable resentments. To give the greater efficacy to their designs the French built forts upon different parts of the inland frontiers, and took every opportunity to render the situation of new settlers extremely perilous. An army of experienced troops was also collected, and

was about to be embarked for America, where, as they had little to defend, they must undoubtedly have intended to become aggressors. But the British ministry had for some time foreseen that war would be unavoidable, and the proposed embarkation of troops seemed to be an evident signal for commencing hostilities. Without waiting therefore till the French declared war, Boscawen was despatched with a fleet to the American coast, where he took two French men-of-war, and chased the rest of the fleet up the river St. Lawrence. At the same time orders were issued for seizing the vessels of France wherever found; and before the end of 1755, about 500 of them, together with about 8000 sailors, were in the possession of Britain; and before the conclusion of 1757, 30,000 French seamen were made prisoners. In 1755 General Braddock was sent to attack the French forts upon the inland frontiers of the American settlements; but he suffered himself to be surprised by an ambuscade near Fort Du Quesne. General Johnson attacked the French near Crown Point, on the Lake Ontario, and was more successful than the unfortunate Braddock. In 1758, after various inferior transactions, the British made themselves masters of Frontenac and Fort Du Quesne, as well as of Louisburg, and of the chief French settlements in North America. Near Ticonderoga, indeed, the British were again defeated; but the attack made by Wolfe on Quebec in 1759 was completely successful. Wolfe purchased his victory and his reputation with his life; but Monkton and Townshend, who succeeded him, ably supplied his place; and Amherst soon overran the whole of Canada, and almost annihilated the colonial empire of the French. The latter had not confined their undermining acts of policy to America. In the East Indies also they had carefully ingratiated themselves with the native powers, and incited them to engage in hostilities with the British. Their success in this undertaking, however, was, if possible, less than in America. The British arms under Clive were so completely successful in every quarter, that the power and influence of Britain in the East were more than ever extended, and the foundation laid of our magnificent empire in that quarter. The French were driven from their few India possessions, and have never been able to re-establish their importance in that part of the world. But the exertions of the British were not equally successful in the Mediterranean. Byng, with a fleet at least equal to that of the French, having been encountered and defeated by La Galissonière, was tried for cowardice, and shot on board the fleet at Portsmouth; and General Blackney, in consequence of Byng's failure, was compelled to abandon Minorca. About this time Mr. Pitt was introduced into the administration. This minister adopted a new system of operations against France by fitting out an expedition to carry the armies of Britain into her enemy's country. It sailed under Mordaunt, on the 8th of September, 1757, but returned without effecting anything; and the French, having attacked the Electorate of Hanover, compelled the Duke of Cumberland to sign a disgraceful capitulation. In the following year his Britannic majesty entered into a treaty of mutual defence with Prussia, and the Hanoverian forces under the Prussian general drove the enemy from their dominions. France now projected another invasion of her great rival's country; but towards the conclusion of 1759, when the invasion was to be attempted, the Toulon fleet was defeated by Boscawen, and the Brest fleet by Hawke. In 1760 George II. died, and was succeeded by George III., his grandson.

When George III. succeeded to the throne, he was extremely willing to procure peace to his dominions; but it was judged prudent to continue hostilities until terms honourable and advantageous to the country could be procured. The French were by no means willing to accede to such conditions as the British thought due to their success in several parts of the world; and for the purpose of making a more formidable impression on Britain, a compact had been formed among the branches of the Bourbon family to unite in carrying on the war. This rendered it necessary to declare war against Spain, hitherto pretending to be neutral, but on every occasion almost openly espousing the cause of France. When Spain took part in the war, an invasion of Portugal from that country was immediately attempted; but, by the assistance of a party of British troops, the Spanish arms were soon repelled. Hostilities, in the meantime, were carried on in Germany with undiminished fury, and generally to the advantage of France; but the unsuccessful exertions of the British upon the Continent were more than compensated by their acquisitions in other quarters of the world. They had already taken from the French all their possessions on the American continent; and their colonies in the West Indies now experienced the same fate. The French islands of Martinique, Grenada, the Grenadillas, and St. Vincent were taken possession of; and Havana, the most important West Indian fortress belonging to the Spaniards, was wrested from them. The conquest of Pondicherry completed the degradation of the French arms in the East; and the reduction of Manilla placed the Spanish possessions in a perilous state. These acquisitions were important, and the enemies of Britain, compelled by her numerous conquests, now acceded to terms sufficiently advantageous to the British. The French relinquished all their possessions on the continent of North America; and the whole of that continent, to the E. of the Mississippi, was yielded to Britain. The islands of Martinique, Guadeloupe, Mariegalante, and Deseada (Desirade) were yielded to the French; the island of Cuba, to Spain; the other conquered islands were allowed to remain in the power of the British; the possession of Senegal, in Africa, was secured to Britain; and Goree was yielded to France. The East India Company restored to the French all their possessions in Asia, on condition that they should maintain neither forts nor troops in Bengal; and Manilla was resigned to the Spaniards, who in return allowed the British to cut logwood in the Bay of Honduras. In Europe everything was restored to that state in which it had been before the war. This peace was concluded in Paris on the 10th of February, 1763.

The terms of this treaty were not such as the country had expected. Pitt, who had retired from office some time before, characterized it as 'obscuring all the glories of the war, surrendering the dearest interests of the nation, and sacrificing public faith, by an abandonment of its allies.' Lord Bute, 'the new favourite,' as he was called, felt himself unable to keep his ground as premier against the opposition, now composed of the ablest and most distinguished men of the country, and, making a merit of necessity, gave in his resignation, and was succeeded by Grenville. A general coalition of parties was soon after attempted, but without success, and party spirit raged with more keenness than ever. Among the political publications of the day, the North Briton, edited by John Wilkes, member of Parliament for Aylesbury, was distinguished by its boldness and virulence. A prosecution was commenced against its author, but the proceedings instituted against him only tended to establish him more and more as the idol of the people. The new minister, however, got Parliament, after a hot debate, to declare the forty-fifth number of the North Briton 'a false, scandalous, and seditious libel;' and after this petty

triumph, plunged himself into new and still more threatening difficulties. During the war, which had been undertaken chiefly for the defence of the colonies in America, upwards of £72,000,000 had been added to the national debt. When the ardour of conquest had abated, the payment of the interest of a debt so enormous excited many complaints. It appeared to the people of Britain to be extremely just, that the Americans, on whose account great part of the debt had been incurred, should assist in the payment of the interest. The Americans, on the other hand, did not deny the justice of subjecting the colonies to taxes, but insisted that if the British Parliament claimed the right of taxing the colonists, these colonists had a right to be represented in Parliament, in order that, like other British subjects, they might be taxed only in consequence of their own consent. Grenville, however, was tenacious of his purpose, and introduced a bill for imposing certain stamp-duties on the American colonies and plantations. General Conway and Colonel Barré in vain opposed the measure, and protested against the right thus assumed by the legislature; the minister carried his point, and the memorable decree went forth, which proved such a monument of British folly. Grenville's party, however, was shortly after this supplanted by the Rockingham administration, which effected an important concession to the American colonies; but its measures gave offence to a high personage; and Pitt, now advanced to the peerage by the title of the Earl of Chatham, was directed to form a new ministry. The new administration renewed the foolish plan of taxing the colonies; and, on Lord North's introduction into it, Lord Chatham again retired from office. Nothing could be more impolitic and unfortunate than North's administration for twelve successive years. The act of 1767, imposing certain port-duties, was followed by the appointment of an American board of commissioners; and all the representations and complaints, as well as the demonstrations of excited feeling on the part of the Americans, were utterly lost on the infatuated ministry. In 1775 Lord Chatham's bill for settling the troubles in America was rejected by a majority of sixty-one to thirty-two voices; and next day Lord North moved an address to the king, declaring America in a state of rebellion. The humiliating result of the struggle which now ensued betwixt the mother-country and her colonies was such as the wise foresaw. Meantime London, in the month of June, 1780, exhibited a frightful scene of confusion and riot, in consequence of the popular agitation on the subject of the Roman Catholic Relief Bill, fomented by the insane conduct of Lord George Gordon. A heavy misfortune was also experienced this year, in the capture, by the Spaniards, of the East and West India fleets in the Bay of Biscay. The famous confederacy established by the Empress of Russia, under the name of the Armed Neutrality, aimed a severe blow at our continental connections at this juncture; and the appearance of Hyder Ali in the East threatened the safety of our possessions in India. The raising of the siege of Gibraltar, the taking of St. Eustatia, the action betwixt the Dutch and British fleets on the Dogger-bank, and the capture of a large part of the French Indian fleet, form the principal events in the concluding years of North's administration, who was driven from the helm in 1782.

The Marquis of Rockingham, as first lord of the treasury, and the Earl of Shelburne and Charles Fox, as secretaries of state, had conducted the new administration for a short period, when the death of the former nobleman led to new ministerial arrangements, and Pitt, the younger son of Lord Chatham, was appointed chancellor of the exchequer. On the 30th of November, 1782, the long-protracted struggle betwixt Britain and her American colonies was brought to a close by the signing of provisional articles of peace at Paris. But ministerial propositions having been rejected in the meeting of Parliament after the recess, a resignation followed, and the celebrated coalition ministry, with the Duke of Portland as first lord of the treasury, and Lord North and Fox as secretaries of state, was organized. This ministry enjoyed a mere ephemeral existence. On the rejection of the India Bill, the two secretaries were required to deliver up their seals of office, and a new ministry was appointed on the succeeding day, at the head of which Pitt, then only twenty-four years of age, was placed as first lord of the treasury and chancellor of the exchequer. The affairs of Ireland and India, and the impeachment of Hastings, were among the first subjects which occupied the attention of Pitt's ministry. A treaty of defensive alliance between Great Britain and the United Provinces, and a similar treaty with Prussia, were signed in 1788. The discussion on the Regency Bill engrossed the attention of Parliament in the ensuing session.

The situation of France in the following year presented an object of engrossing and overwhelming interest to all Europe; nor was Britain the least interested spectator of that extraordinary moral and political revolution which now convulsed her hereditary foe. Burke's Reflections on the French Revolution, Paine's celebrated Rights of Man, and Mackintosh's Vindiciæ Gallicæ, contributed not a little to direct and inflame the zeal of the conflicting parties in this country, whose violence in several instances carried them far beyond the bounds of moderation. On the execution of Louis, an order was issued for the departure of the French ambassador at the court of London within eight days; and war was declared by the National Convention of France against Britain and Holland, on the 1st of February, 1793. The British ambassador had indeed been recalled from Paris during the insurrections which occurred in that city in the autumn of the preceding year; but the declaration of war proceeded in the first instance from Paris. A speedy termination of the struggle, in favour of the allied powers, was certainly anticipated by Pitt before he lent himself to the coalition against France; but it soon appeared that the national resources of France had been greatly underrated. These, joined to the national enthusiasm, and in the hands of able and vigorous-minded men, were such as enabled France, single-handed, to contend successfully against all Europe. The career of her armies, under such men as Bonaparte, Moreau, Kleber, and Hoche, was everywhere triumphant; and on the conclusion of the peace of Campo Formio, in 1797, Britain stood alone in the conflict. But the war now becoming strictly maritime, her attitude, not less strikingly than that of France in 1794, exhibited the advantage possessed by a nation when combining its resources on its proper element. In this first great contest France and Britain were placed successively in opposition to a confederacy of the other European powers, and successfully resisted the fearful odds brought against them; each nation also added largely to its territorial possessions; and each, though exhausted, continued capable of prolonging the contest. But the policy of peace was apparent; there remained no definite object of warfare; and accordingly a treaty of peace was signed at Amiens on the 27th of March, 1802, after the retirement of Pitt from office.

This peace, however, was of short duration. Bonaparte excited the jealousy of the British by new

pretensions, and war was declared against France, May 18, 1803. Into the details of this long and disastrous war we shall not here enter. The principal engagements are duly recorded under their respective heads. All that we propose in this place is a very brief historical summary of events.

The French took Hanover, extended to the greatest degree their exclusive system against Britain, formed an alliance with Holland, the Italian Republic, and afterwards with Spain, and threatened England with an invasion. Pitt, who had again joined the ministry, dissipated the fear of the last by exciting a new war on the Continent (1805), which, however, only conducted Napoleon to new conquests and acquisitions; but the British possessed the command of the sea, and the battle of Trafalgar (Oct. 21, 1805), in which Nelson fell, crowned the fame of their arms. Pitt died Jan. 23, 1806. The new ministry (Grenville, Addington, Fox) were inclined to peace; but after the acquisitions which Napoleon had made in the war against Russia and Prussia, and after his decrees of Berlin and Milan, they could not be reconciled to him without acknowledging his supremacy on the Continent. All the endeavours of Britain, therefore, were directed to maintaining and extending her power upon the sea. The bombardment of Copenhagen, and the seizure of the Danish fleet (September, 1807), increased the enemies of England. Even Russia renounced her alliance. But the offers of peace made at Erfurt, by the Emperors of Russia and France, were rejected by the British government, because it would not acknowledge Joseph Bonaparte king of Spain. Already had a British army, sent to Portugal, compelled the French general Junot, and the Russian fleet lying in the Tagus, to capitulate (Aug. 30 and Sept. 3, 1808). The Spaniards who had risen against France were supplied with money, military stores, and troops; Cayenne, the island of Martinique, and the Ionian Islands as far as Corfu and St. Maura, were conquered; and an expedition (the Walcheren) against Zealand and Flanders was undertaken, but failed (1809); in the next year, however, the islands of Guadeloupe, St. Martin, St. Eustatia, Amboyna, Bourbon, and the Isle of France, were taken by the British. Soon after, the mental disorder of the king made a regency necessary, which the Parliament conferred upon the Prince of Wales.

The British government, being determined not to make peace with France till she retired within her former limits, and received again her ancient family of princes, opened the campaign of 1812 with new hopes. Britain was soon the soul of the coalition which was formed on the Continent; the influence of her wealth was felt everywhere. She pressed with overpowering weight on the sinking power of France in Spain. A new war with the United States of North America (concluded by the Peace of Ghent, Dec. 24, 1814) did not prevent her from applying her strength to the affairs of the Continent. The result corresponded to her great exertions. The allies entered Paris. Wellington, after he had delivered Spain from the French at the head of the united British, Spanish, and Portuguese force, crossed the Pyrenees, and advanced upon Bordeaux and Toulouse. The restoration of the Bourbons followed the expulsion of Napoleon, and the French received a constitution based upon liberal principles. Britain gave back, without hesitation, all her French conquests, with the exception of Tobago, St. Lucie, and the Isle of France. At the same time she retained, of her Dutch conquests, the Cape of Good Hope, Demerara, Essequibo, and Berbice; of her Danish, Heligoland; and of her Italian, Malta; and obtained the protection of the Ionian Isles. Her acquisitions, in respect to territorial possessions and political importance, were therefore very great; especially as, at the same time, her East Indian dominions were increased by the acquisition of the territories of the King of Candy; so that the whole of Ceylon became subject to the British crown. Hanover likewise received considerable additions, and the name of a kingdom. The return of Napoleon afforded the British arms an opportunity of gaining new fame in the battle of Waterloo, in consequence of which Napoleon gave himself up to the British (July 13, 1815).

1815. The political attitude of Britain had been for twenty-three years warlike. All the wars of the European continent, against the revolution and against the empire, were begun by Britain, and supported by British gold. At last the object was attained: not only was the ancient family restored to the throne, but France was reduced to its original limits, its naval force destroyed, and its commerce almost annihilated. But victory brought bitter fruits even to Britain, which, after several years of peace, came to maturity. A debt, of which the capital amounted to more than forty years' revenue of the kingdom, and internal disturbances which threatened the greatest danger, demanded from the ministry the most cautious and judicious measures. The absurd opinion, that war opens such sources of prosperity to a country as compensate for the resources which it consumes, had been contradicted by experience. Frugality and forbearance from all superfluous expense, particularly from war, have therefore been, since 1815, the first law of the government, by which the policy of Britain has become as peaceful as it had formerly been warlike. Notwithstanding the British government has formally opposed the principle, maintained by many of the other European powers, that the European association of states has a right to put down by force any attempt on the part of the people of an existing government to overturn it, namely, the right of *armed interference*, as it is called, yet they have carefully avoided going farther than a mere verbal explanation of their views. On the entrance of Canning into the department of foreign affairs, after the suicide of Londonderry, the British withdrew from the continental system of politics.

After the termination of the wars with Napoleon, notwithstanding the economy of the government, particularly shown in the reduction of the army, so great a burden was left upon the nation, and the bad harvests of 1816 and 1817 had made the necessities of the manufacturers so urgent, that this class of the nation was reduced to despair. In June, 1819, disturbances began in the manufacturing districts. Meetings were held, in which annual parliaments and a radical reform in the election of members were the great topics of declamation. The well-known Hunt was conspicuous on these occasions. The assemblies went so far as to choose delegates for a new Parliament; and no one knew what a mob of many thousands might undertake next. Serious measures were therefore adopted. Such a mob at Manchester (Aug. 16, 1819) was dispersed by the authorities of that place, by means of a military force. On this occasion many persons were killed and wounded. The authorities were reproached, not only with having used force without necessity, but also as having violated the forms of law. Judicial proceedings were instituted against them, which ended with their acquittal. These violent excitements continued to assume every day a more dangerous character, and the ministry were compelled to propose to Parliament, at the end of the year, extraordinary measures, which, a month before, had been determined upon in Germany for five years. These were

adopted by the Parliament, to be continued for five years likewise, and consisted of five articles: 1, a prohibition of private military exercises; 2, of the possession of weapons; 3, of the liberty of holding meetings of the people without the permission of the local authorities; 4, the application of the severe stamp system to pamphlets under two sheets, and a more rigorous punishment of libels, and of seditious or irreligious writings; lastly, 5, the acceleration of judicial proceedings in case of small offences.

The death of George III. (January 29, 1820) made no change in these respects, though it produced many important consequences. The dangers of radicalism vanished, as peace, the consequent diminution of taxes, the increased demand for manufactures abroad, particularly in Spanish America, better harvests, and cheaper means of living, again improved the situation of the manufacturers. The renewal of specie payments, by which the value of the paper currency was increased, was also of great effect, and was particularly favourable to the manufacturers. The last convulsion of this disorder was the conspiracy of a band of desperate men, under the conduct of Arthur Thistlewood, a man who had sunk from a respectable standing by misconduct, to assassinate all the ministers. They were betrayed. Thistlewood and four of the other conspirators were executed, and four others were transported for life to Botany Bay.

If much revolutionary spirit had really existed in Britain, and given occasion to these disorders, instead of their having sprung, as they did, merely from want, it would have taken a very dangerous turn at the time of the trial of the queen. This trial, which was brought on by faults and passions on both sides, and in which all regard to female dignity and princely honour was trodden under foot, gave a new pretext, a new rallying-point, to the discontented. It began, upon the return of the queen to England (June 6, 1820), by a message to the Parliament to inquire into her conduct; whereupon a ministerial motion followed, proposing an injudicious personal penal law (bill of pains and penalties), discreditable to the British legislature. The purport of the bill was, that Queen Caroline had forfeited the title, rights, and prerogatives of a queen of England, and that her marriage with the king was to be regarded as dissolved. The shameful charges brought against the queen in Parliament were retaliated by the most bitter satire upon the king. The opposition among the people to this measure was so great, that the ministers dared not bring into the lower house the bill passed in the upper. The time was likewise too dangerous, as the revolutions in Spain, Portugal, and Naples followed each other in quick succession.

The assassination of the Duke of Berry (Feb. 13, 1820), the Cato Street conspiracy (Feb. 23), were important symptoms. The crisis in Britain, however, passed quickly over. The disturbances among the manufacturers ceased as their wants were alleviated; the popularity of the king was re-established by a journey through his dominions; and the queen was almost forgotten when she died, Aug. 7, 1821. See GEORGE IV.

But much more serious disorders, in the internal relations of Great Britain, appeared (1822), and showed the consequence of that disproportion which exists in the British Islands between the great landed proprietors and the actual cultivators of the ground. The property of the soil is in comparatively very few hands. Besides the clergy, who possessed about 6000 estates, and the corporations, whose possessions might be reckoned at an equal number, there were then in England but about 20,000 landholders. The British law, which gives to the eldest son all the real estate, is itself sufficient to keep together large masses of landed property; but the pressure of war has done still more. In 1786 there were 250,000 landed proprietors. The small farmers are now, almost without exception, tenants; of whom Mr. Coke alone had 500 around him. In Scotland, the ancient common possessions of the clan have passed to the chief. In Ireland, the ancient proprietors were almost all displaced by the confiscations of Elizabeth, Cromwell, and William III., and their landed estates divided among a few English families. Besides their own possessions, the Established clergy in England have tithes from almost all real estate. In 1818 the high price of corn had sunk; and in 1820 the value of money was increased by the renewal of specie payments at the banks: so that ruin threatened the tenantry (in England the strength of the nation, and in Ireland the great mass of the people), from their inability to fulfil the terms of their leases, which had been made when the value of money was less. In England they expected general poverty. In Ireland a famine arose, in consequence of a bad harvest. In Scotland the inhabitants were expelled from their places of residence. One proprietor (in April, 1820) removed 600 families from their farms, in the county of Ross: in the county of Sutherland, the Marchioness of Stafford did the same towards 15,000 persons, turning their farms into sheep-walks, for the sake of greater profit! In England, this state of the agricultural population excited far more anxiety than the disturbances of the manufacturing districts, because it affected a more important and energetic part of the nation, and sprung from a deep and permanent cause; but the means proposed to remedy the evil were very various. The ministry pointed out, as the true cause of this evil, the abolition of the income tax by act of Parliament, which they had, even in 1816, declared a victory of the rich over the poor, the consequences of which were now developed. By this victory all personal estate, the revenue from capital and from the colonial possessions, were exempted from taxation; in consequence of which the burden fell almost entirely upon the working-class, and on the consumption of the necessaries of life. The assertions of the opposition, that the distress of the country was the consequence of the excessive taxes, were indeed not without foundation; but all the possible means of saving, particularly the abolition of sinecures, including clerical ones, could have afforded no real remedy, which was to be looked for in a more equal division of taxes,—a measure as disagreeable to the opposition as to the ministerial party. No one even dared to propose the obvious measure, of the reduction of rents, in proportion to the rise in value of the paper, consequent upon the resumption of specie payments by the bank. This increase in value amounted to 15 per cent.; and the rents should have been reduced in proportion. Some proprietors, indeed, did reduce the rents of their tenantry, 10, 15, and even 30 per cent.; but we cannot say what proportion they bore to those who did not.

Great Britain was neutral during the French invasion of Spain, in 1823; allowed her subjects to aid the cause of Greece, and acknowledged the Greek insurgents' right of blockade. She concluded a treaty of trade and alliance with the new American republics, which she formally acknowledged in 1825. A bill for the removal of the Catholic disabilities was brought forward in this session, and passed the House of Commons, but was lost in the House of Lords; and the disorders in Ireland continued. Between 1824 and 1826 a war was carried on with the Burmese, which resulted, in the latter year, in the cession of Arracan and the Tenasserim Provinces to the East India Company.

In 1825 and 1826 great commercial difficul-

took place, in consequence of a mania for speculation in foreign loans, and in costly undertakings, conducted by joint-stock companies, together with an overloading of foreign markets with British manufactures. Numerous bankruptcies took place, and credit experienced a great shock. The distress soon subsided in London, but in the country its effects were longer felt, and fell upon persons less able to bear loss. Numerous private bankers, many with little or no capital, had engrossed the circulation of their respective districts, and bank after bank became insolvent, involving the labouring classes in their ruin. Thus the entire currency of the country was deranged. The misery was so general as to call for the immediate aid of the government. Bullion happened to be lower than the mint price, and the officers of the mint were ordered to coin sovereigns with all possible despatch. They were coined at the rate of 100,000 a day, and for one week at the rate of 150,000, and sent off in every direction. Besides this, however, the Bank of England was obliged to make temporary issues of one and two pound notes; and thus the progress of the evil was averted. Ministers availed themselves of this opportunity to mitigate the strictness of the corn-laws, and to protect the manufacturers against the monopoly of the great landed proprietors.

The sympathies of all Christendom having been outraged by the events of the war going on between the Turks and Greeks, the British cabinet entered into an arrangement with Russia, to compel the Porte, dissuasion failing, to cease hostilities against its Christian subjects. A few days afterwards (April 13) the Canning administration was formed. July 6, 1827, the French government acceded to the Greek protective alliance, and a conjoint armed intervention following, the untoward battle of Navarino resulted, Oct. 20. Previously (Aug. 8) Canning died, and the premiership of his quasi-Whig administration devolved on Lord Goderich. Jan. 8, 1828, the latter resigned, and the Duke of Wellington formed a Tory cabinet. Soon afterwards it abolished the Corporation and Test Acts; and in April, 1829, allowed the Catholic Relief Bill to pass. June 26, 1830, George IV. died, and was succeeded by William IV. Next month, a revolution and change of dynasty took place in France, which had a great effect in strengthening the ever-growing desire for reform in Britain. The duke having expressed a determination to resist all radical changes, was outvoted on a critical question, and (Nov. 16) retired from office, when a reform administration succeeded, headed by Earl Grey. Lord John Russell brought in the first Reform Bill, March 1, 1831; but it was rejected. A second bill having been prepared, it passed after some opposition, and the royal assent was (unwillingly) given to the English Reform Bill, June 7; to the Scotch, July 17; to the Irish, Aug. 7, 1832. The next great public measure was the abolition of negro slavery for ever, in every British possession, by an act passed Aug. 1, 1834. William IV. died June 20, 1837, and was succeeded by Victoria, who was married to Prince Albert of Coburg-Gotha, Feb. 10, 1840. Their eldest son, now Prince of Wales, was born on the 9th Nov. 1841. In 1851 (May 1) the Crystal Palace, or great museum of the world's industry, was opened. In 1852 another addition was made to our Eastern Empire by the incorporation of the province of Pegu with the possessions of the East India Company. In 1852-53 dissension arose regarding the rights of the Latin and Greek churches to preferable access to the 'holy places' in Palestine. The Emperor of Russia, resenting concessions made to French devotees, sent Prince Menschikoff to Constantinople, to demand redress for the pretended wrong. From Feb. 28 till May 21, 1853, the negotiation between the prince and the Turkish ministers lasted, when he left for Russia, menacing war; this was virtually declared in a Russian manifesto, dated June 26, which was followed by military occupation of Moldavia and Walachia. The Porte sent forces to resist the Russians, both in the principalities and in Eastern Anatolia, invaded simultaneously by them. An alliance, offensive and defensive, between Britain and France, was formed, and war was declared against Russia, March 28, 1854. The Crimea became the chief seat of the war, though military operations were also carried on between the Turks and Russians on the Danube, and several naval expeditions were sent to the Baltic. In the beginning of September the allied fleet appeared in the Black Sea, off the coast of the Crimea, and the army was disembarked and led southwards towards Sebastopol. On the banks of the Alma the allies encountered a strongly-posted Russian force under Prince Menschikoff, which after a severe contest was obliged to give way, leaving the road open to Sebastopol. The fortifications of Sebastopol were very strong, being deemed almost impregnable on the side of the sea, and the allies determined to reduce it by a regular siege. The utmost skill, courage and perseverance were displayed on both sides, and the siege ranks as one of the most memorable of modern times. The town was never completely invested, and the communication of the besieged with the country always remained open, while their forces were as numerous as those of the allies, and at one time more so. In the beginning of the siege two battles were fought, both of which resulted unfavourably to the Russians—that of Balaklava on the 25th of October, and that of Inkerman on the 5th of November. While the siege was progressing important positions in the Crimea were gradually occupied, and the peninsula was virtually conquered. On the 7th of June, 1855, the Mamelon, a commanding height, was taken; and on the 8th of September the Malakoff tower was stormed by the French, though the English failed in their attack on the Redan. The Russians then withdrew to the northern side of the harbour, after sinking their ships, and blowing up the fortifications of the town, which was now taken possession of by the allies. Kinburn was next taken, but with the exception of some fighting of little importance, the war was now at an end. At a congress of the great powers at Paris, on March 30, 1856, peace was concluded on the following terms:—that Russia should abandon her protectorate over the Danubian Principalities; that the frontier between Turkey and Russia should be rectified by the cession of a part of Bessarabia to the former; that the navigation of the Danube should be free; and that the Black Sea should be neutral, and open to the commerce of every nation, and should not be traversed by naval armaments.

Scarcely was the Crimean war over when Britain was threatened with the loss of her possessions in India through the mutiny of the Sepoys, and had to fight in that distant region with soldiers trained and armed by herself. Symptoms of discontent and disaffection had for some time been manifested by the native troops in the British service, especially in Bengal; and on 1st May, 1857, a regiment of cavalry stationed at Lucknow broke out into open mutiny, but were soon put down. On the 10th several regiments stationed at Meerut, about 40 miles from Delhi, rose against their officers, and after killing and wounding a number of them, proceeded to murder every European on whom they could lay their hands, without distinction of age or sex. The flame of rebellion spread. Regiment after regiment joined the mutiny, and for a time the authority of government

was entirely suspended throughout the greater part of Bengal, the whole of Oude, and a large portion of Central India. This state of affairs did not last long however. British troops were speedily brought from Burmah, Mauritius, the Cape, and elsewhere, and the rebels soon found that they had undertaken what was quite beyond their powers. We cannot here give anything like a full account of the suppression of the mutiny, and of the heroic efforts which led to this result, but must refer the reader to the article INDIAN MUTINY. Suffice it to say, that within eight months there were something like 70,000 British troops in India, and by the end of 1858 the rebellion was entirely crushed. One result of the mutiny was that by a bill passed Aug. 2, 1858, the sovereignty hitherto exercised over our possessions in India by the East India Company was transferred to the crown, the board of directors of that company being abolished, and a minister named by the crown and responsible to Parliament, assisted by a council of fifteen members, being put in their place.

Since the close of the Indian mutiny the peace of the empire has been little disturbed, and the attention of the British government and Parliament has been devoted chiefly to measures of domestic policy. Unimportant wars with China, Bhotan, the natives of New Zealand, and Abyssinia have occurred, but otherwise our foreign policy has been mostly directed towards strengthening our commercial relations both with European and with extra-European states, and important treaties having this object in view have been concluded with France, Italy, the German Zollverein, Austria, China, Japan, and Siam. During the civil war in America, as well as the various European wars which have taken place within recent times, Great Britain remained neutral, although the popular sympathies were usually more or less unmistakably manifested. But of course it was impossible for us to remain entirely unaffected by these commotions, even although we took no active part in them. The civil war in America, between 1861 and 1866, especially, had a most injurious effect on one of our most important industries. It almost entirely stopped our supply of raw cotton, which up till that time had been almost exclusively obtained from the Southern States of the Union, and in consequence of this a large number of cotton-spinners, chiefly in Lancashire, were thrown out of employment and reduced to the greatest distress. In course of time however, by the exertions made to secure increased supplies of the raw material elsewhere, as well as by the subjugation of the Southern States by the North, which permitted of our again obtaining supplies from the former, the difficulties of that period were got over. (See COTTON FAMINE.) To this war also is at least in part to be attributed the formation of the society calling itself the Fenian Brotherhood, which had for its object the separation of Ireland from the United Kingdom, and the establishment of an Irish republic, and which caused no little alarm in this country at various times between 1861 and 1867. (See FENIANS.) Another matter which grew out of this war was the Alabama question, which caused a good deal of bitterness of feeling between England and the United States, until it was settled by arbitration at Geneva in 1872. See ALABAMA.

Of the various large questions of domestic policy that awaited legislation, the foremost was that of parliamentary reform. The settlement of this question was attempted by several governments, but without success, until the government of the Earl of Derby in 1867 proposed the principle of household suffrage, and brought in a bill with the object of establishing that principle, which became law on the 15th of August. (See below, sec. *Parliament.*) The Scotch and Irish Reform Bills passed in 1868. Two events worthy of mention marked the colonial and foreign policy of Lord Derby's government. One was the passing, in the spring of 1867, of a bill to unite Upper and Lower Canada along with the maritime provinces of British North America into a confederation which was to have a common parliament and to be called the Dominion of Canada. The bill also made provision for the entry into the Dominion of the other provinces of British North America, if it was their desire to do so. The other event was the sending out of an expedition to Abyssinia for the release of the British consul and the European missionaries who had been imprisoned by King Theodore. The expedition started in the autumn of 1867, and effected its object in the spring of 1868, but not before Lord Derby had retired from the office of first lord of the treasury owing to failing health. His successor was Disraeli, who had hitherto been chancellor of the exchequer in Lord Derby's government. Disraeli remained in office during the remainder of the current session of Parliament, but before the beginning of the next session, a general election having in the meantime taken place which left Disraeli's party opposed to an immense Liberal majority, he tendered his resignation (Dec. 2, 1868), recommending Gladstone as his successor. The administration of Gladstone was distinguished by a series of measures which made important changes both in church and state. The session of 1869, the first of the new government and the new Parliament, saw the passing of a bill providing for the disestablishment and disendowment of the Irish Church on the 1st of Jan., 1871. In 1870 an equally important and comprehensive measure, the Irish Land Bill, having for its object the regulation of the relations between landlord and tenant in Ireland, became law; and during the same session the first act of Parliament establishing a national system of education for England was passed. Soon after the opening of the session of 1871, an Army Bill was introduced which aimed first at the abolition of the practice of obtaining commissions in the army by purchase, inasmuch as this was considered the chief obstacle in the way of all further reforms in the army; and secondly at the reorganization of the collective forces of the empire. The bill was violently opposed in the House of Commons, chiefly on account of the first of its two provisions just mentioned, and was at first rejected in the House of Lords; but when Gladstone took the step of abolishing purchase by royal warrant, and again brought the bill before the House of Lords, it was on this second occasion passed. The two most important acts of the following session were the Ballot Act, which was passed on the 18th July, 1872; and the Scotch Education Act, passed 6th August, 1872.

The Civil State.—The British nation may be considered as divided into three classes, the *nobility*, *gentry*, and *commonalty*. The clergy do not form a separate estate, as in most countries of Europe. The laws however acknowledge only two distinctions, the nobility and the commonalty, the latter including the gentry. The distinction between the nobility and commonalty is by no means like that between the patricians and plebeians in ancient Rome, nor that between the nobles and citizens of France in the last century. Intermarriages, it is well known, are usual: only the eldest son inherits the rank and titles of the ancestor; the way to the highest dignities is always open to talent and merit, and the privileges of nobility are not of a kind to wound the self-respect of a commoner. The gentry are not, like the lower nobility in many countries, separated by political privileges from the commonalty, but are represented along with

the latter in the House of Commons, where wealth, industry, talent, and knowledge are the great moving powers. Nor have the high ecclesiastical dignities (as in some cases in Germany), nor the great offices of state, been connected with birth. Two queens have reigned in England (Mary and Anne), whose mother, Ann Hyde (wife of James II.), was the daughter of an English lawyer (Lord Clarendon). The British gentry enjoy no exemption from taxes or other civil burdens: the peers indeed are exempted from the performance of many little public services, such as sitting on juries, &c. They have also a right to be tried by the House of Lords on indictments for treason, or felony, or misprision thereof; but the administration of justice before this tribunal is as strict as in the ordinary courts. Their persons cannot be arrested in civil cases. The civil state of the English nation has acquired its present organization, like the other institutions of the country, by a gradual development and modifications suited to the spirit of the age, but retarded by the attachment of the nation to old customs. The nobility still bears traces of the pre-Norman times, although it cannot strictly be said that there was then a hereditary nobility in the modern sense of the word. The *athelings* were only the members of the royal family, and probably only the sons and grandsons of the king. The Archbishop of England, by virtue of his spiritual dignity, and not as some have stated in the character of landed proprietor, was equal to them in rank and privileges, and had the same *weregild*. The country was divided into shires, afterwards called *counties*, each of which was governed by an *ealdorman;* but this dignity was not hereditary. (See ALDERMAN.) Among the freemen the royal officers and thanes enjoyed particular privileges, but their dignity was not hereditary, and the *ceorls*, or husbandmen, attained the same rank when they owned five hides of land, together with a chapel, a kitchen, a hall, and a bell. A merchant who had made three voyages on his own account received the title of *thane*. The free peasants (according to their various relations to the soil, called *ceorls*, *cotsets*, *bovarii*, *bowers*, *bure*), the serfs or bondsmen, employed partly in personal services, and partly in the cultivation of the ground (in Saxon, *theowas* or *esnas;* in Daniah, *thraels*), made up the rest of the people. The lines of distinction between these different classes were not very broad, and it was not difficult for a serf to become a freeman, a freeman a thane, and a thane an ealdorman. Towards the end of the Anglo-Saxon period, there was a tendency to render all these distinctions hereditary, which was completed and fixed by the Norman conquest. The dignity of governor of a county became hereditary and feudal, but in the course of a century had ceased to be anything more than titular. In the reign of King John the earls, the descendants of the former governors, were merely the first class of barons, generally indeed with great landed estates, but without any official character. This had devolved on the sheriffs (*shire-gerefan*, *vicecomites*, *exactores*, reeves of the shire), who have continued to the present time. The whole property of the soil was vested in the king as the lord paramount after the Conquest, and everything became hereditary; even the bishops and mitred abbots became barons. The holders of fiefs, obliged to render military service for their lands, constituted the knighthood; the nobility, consisting of the two classes of earls and barons, had a seat in Parliament, where the knights appeared only by deputies. That amidst these changes many free husbandmen should be converted into villeins, is not astonishing; yet the Commons, particularly in the city of London, had become so powerful, and the freeholders so numerous, that the tendency to liberty in the nation was decided. The risings of the people against the oppressions of the barons in the reign of Richard II. (1381), when the abolition of slavery and its consequent grievances was demanded, showed to what the nation was tending, and before two hundred years afterwards every trace of villenage had disappeared. The landed proprietors of all classes participated as freeholders in the choice of members of Parliament; the tenants only who had no property in the soil, and the copyholders, who were originally tenants at will, and afterwards acquired a certain limited property in the soil, were not admitted to this privilege. To the two ranks of nobility above-mentioned three others were afterwards added. Edward III., in the brilliant period of his conquests, created his eldest son Duke of Cornwall (1337), and also established the ducal dignities of Clarence and Lancaster (1362). Richard II. not only created his uncles Dukes of York and Gloucester, but bestowed on his favourite, Robert de Vere, the title of *Duke of Ireland*. Since that time the ducal title has remained the highest title of nobility. The Duke of Lancaster was the only one who really possessed a duchy, the county of Lancaster having been bestowed on John of Gaunt, Edward's fourth son, with the royalties thereto belonging. Although the duchy was reunited to the crown in 1461, this county is still a county palatine. After this period the ducal title was held by many families; but in the wars of York and Lancaster, and by the numerous condemnations for high treason, most of them became extinct. There are now only two dukes whose titles date from a period antecedent to the reign of Charles II.—the Duke of Norfolk (from 1483) and the Duke of Somerset (from 1546). Charles II. bestowed the title on his natural sons. Since the accession of George III. it has been bestowed only on the royal princes, and on the Dukes of Wellington, Buckingham, Sutherland, Northumberland, Cleveland, and Leinster. Thus, six noble personages have received this honour since 1766. The title of marquis was introduced in the time of Richard II. It is the next in rank to the ducal dignity. Next in degree are the earls (which see), the oldest of all these titles. The title of viscount was introduced during the reign of Henry VI. The name of baron was introduced by William the Conqueror, and forms a rank of nobility lower than the earls. (See BARON.) There are besides official barons, as barons of the exchequer, barons of the Cinque Ports, &c., who are not peers, have no seat in the upper house, and whose title is not hereditary. Each individual of the higher nobility is called *lord*, and is a peer of the realm. The title of *lord* attaches to the mayoralties of London, York, and Dublin, but only during the term of office. The archbishops and bishops of the Church of England have also the privileges of the higher nobility, of which the chief is a seat in the House of Peers; but this dignity is only in virtue of their ecclesiastical offices. The Scottish and Irish peers sit in the house only by deputation; the former electing sixteen, and the latter twenty-eight of their number for this purpose. The titles of nobility mentioned above are inherited by the eldest son, who during the life of the father bears by courtesy his second title; if the father be a viscount or baron only the son is an 'honourable.' The other privileges of the higher nobility are inconsiderable.

The gentry may be said to include the rich but untitled landed proprietors, and in general all to whom wealth, office, or talents, united with good manners, secure respect. The title of *esquire* (*ecuyer*, *scutifer*, *armiger*) belongs to all civil officers, from the justice of peace upwards, to doctors and barristers. The eldest sons of knights and the younger sons of

peers inherit it. All foreign nobles, even the Irish peers, are only reckoned among the esquires in England. The next degree is that of knights (which see), among which are the baronets (which see); this dignity was created by James I. in 1611, and descends to the eldest son. In order to raise money, he granted to 100 persons the right of bearing the arms of Ulster and prefixing the title *Sir* to their names, in consideration of the payment of £1000 each. There are no privileges annexed to the baronetcy, but the title is considered as an honour, and is often bestowed on distinguished civil and military officers, and on eminent scientific or literary men. In 1872 they numbered 859. The difference between the gentry and the commonalty is so slight that Blackstone includes them under the same head. The commonalty, taken in its narrowest sense, is composed of yeomen (all freeholders of 40*s.* a year income) and tradesmen, artificers, and labourers. In the reign of Charles II. all military tenures were changed into free and common socage, and all feudal dues and services, with the exception of *frank-almoigne*, and the honorary services of grand sergeantry, were abolished. But even the villeins, from whom the modern copyholders have sprung, were treated as freemen, except in regard to the obligation to render certain services. This appears from the three kinds of courts formerly held in the manors, and which by law may still be held there. The court baron at common law—baron's court, or freeholder's court—was composed of the freeholders, who determined civil controversies arising within the manor. The customary court appertained entirely to the copyholders, and the lord or his steward was the judge. These courts were held every three or four weeks originally in the lord's hall. In cases of criminal jurisdiction all persons commorant within the precinct, freeholders and copyholders, were required to attend the court-leet (in Anglo-Saxon, *folk-right*), which was held in name of the king under the presidency of the lord's steward. Charges of treason or felony he referred to the king's court. Offences of a lighter character were tried by a jury whom he appointed, and conformably to whose verdict he gave judgment.

British Constitution.—We cannot agree with the often repeated assertion of Montesquieu, that the British constitution owes its energy to the strict separation of the three powers—the executive, the judicial, and the legislative. For Parliament exercises an important part of the judicial and executive powers; the latter chiefly in the House of Commons, which keeps up a perpetual oversight on the administration, and performs a great many executive acts by private bills (for the constructing of roads, bridges, canals, &c.); the former by the House of Lords, which is the supreme judicial tribunal of the empire; the king, in the privy-council or in his cabinet, exercises legislative and judicial powers; the three superior courts have a power similar to that of the Roman pretors, as their decisions have, in a degree, the force of laws; and in general the three departments run into each other, so that neither of them has an entirely separate and independent organ. Not less erroneous is the representation of the king and the two houses of Parliament as a mixture of aristocracy, monarchy, and democracy. The Parliament is, even in its reformed state, aristocratic, with the occasional exception of a few members, whom particular circumstances connect with the cause of the people. The lower house is, on the whole, merely an assembly of the wealthy, and the upper house is the same in another form, and with the addition of the aristocratical element of birth. But the rights of the people and the sovereignty of the laws, on which civil freedom depends, are secured by other institutions, the permanence of which is guaranteed by two circumstances; first, that the aristocracy depends on these institutions as a protection against the encroachments of the royal power; and, secondly, the danger that an attempt to abolish them (we speak of the trial by jury, the liberty of the press, &c.) would lead to popular encroachments on the privileges of the aristocracy. The royal power still bears the traces of the old German institutions. From being leaders of a free military community the kings have become feudal superiors of the country, lawgivers (the royal sanction being necessary to the passage of a law), and judges (the superior judges in Westminster were for a long time removable at the royal pleasure, and, by a legal fiction, the king is always considered to be present); but the royal power has been restricted by a great number of express acts and usages. The powers of Parliament are limited only by natural impossibilities, and have often sufficed to overthrow the royal prerogatives. Yet it can do nothing against a decided public opinion, so that it is very justly said that there are three things in the British constitution whose nature and extent cannot be accurately defined—the privileges of Parliament, the prerogatives of the crown, and the liberties of the people. The Anglo-Saxon constitution, as modified (though but little changed in its essential features) by the Norman conquest (1066), is the basis of the English constitution. The general adoption of the feudal system, a greater extension of the seignorial rights, and the introduction of the usages of the Norman court, with which was connected the establishment of the superior judicial and administrative offices, were the principal changes. But the most important features of the Anglo-Saxon institutions—the legislative power of the nation exercised in the *witena-gemót* (assembly of wise men, that is, bishops and nobles) and the *micklegemót* (great assembly), or general assembly of the nation, and the judicial power of the nation exercised in the court-baron and court-leet over the inhabitants of a manor, in the county-court and the sheriffs-tourn, or criminal tribunal of the county, in the assizes and the jury, and finally in the House of Lords over the peers—are preserved, and the extravagant extension of feudal rights was gradually curtailed by royal charters to the time of Henry III.[1]

A. *The Sovereign.*—The fundamental maxim upon which the right of succession to the throne depends is, that the crown is, by common law and constitutional custom, hereditary, but in a peculiar manner, and that the right of inheritance may from time to time be changed or limited by Parliament; under which limitations the crown still continues hereditary. It descends to the males in preference to the females, strictly adhering to the rule of primogeniture. On failure of lineal descendants it goes to the next collateral relations of the deceased king, without distinction of whole or half blood, provided they are lineally descended from the royal stock that originally acquired the crown. The order of descent in the latter case is strictly lineal, so that the female descendants of an elder line have the preference to the male descendants of a younger line; but among brothers and sisters, the males have always the preference. The crown vests immediately in the next

[1] The chief documents of the British Constitution are: 1. The old Charter of Henry I. (*Charta libertatum*); 2. Magna Charta (which see); 3. The Petition of Rights (which see); 4. The Habeas Corpus Bill (which see); 5. The Declaration of Rights, to which William III. was obliged to accede as a condition of his ascending the throne; 6. The Acts of Succession of 1701 and 1705; 7. The Act of Union with Scotland, 1707; 8. That with Ireland, 1801; 9. The bills for amending the representation of the people in Parliament, generally called the Reform Bills, 1832, 1867, and 1868.

cessor, on the death of the reigning king, without any formal act of taking possession. There is, therefore, no interregnum; hence the maxim, The king never dies. The statutes passed in the first year after the restoration of Charles II. are called the acts of the twelfth year of his reign, dated from the death of Charles I. The king is of age at eighteen years: the regency, during the minority, is either settled by the late king's will, or by act of Parliament. The heir to the crown has, since the time of Edward III., inherited the title of Duke of Cornwall, and receives that of Prince of Wales by letters patent. The coronation takes place in Westminster Abbey; the Archbishop of Canterbury has the right of crowning the king, the Archbishop of York the right of crowning the queen. For the support of the royal dignity, &c., the civil list (which see) is granted by Parliament. The king, with his predecessors and successors, constitutes a body politic or sole corporation. The power of changing the succession to the throne has been exercised by Parliament on various occasions, as in the wars of York and Lancaster, and more particularly in 1688, when it declared King James II., and his successors for ever, to have forfeited the crown, and by the Act of Settlement (1700), when it restricted the succession to the Protestant descendants of the Princess Sophia, youngest daughter of the Princess Palatine Elizabeth (daughter of James I.) The power of the king is limited by the laws, and is constitutionally derived from a fundamental compact between him and the nation. The divine right, so obstinately maintained by the Stuarts, was never recognized by the nation, and William III., Mary, and Anne ascended the throne, according to express declarations, only by virtue of a transmission of the crown to them by the nation. But the maxim has been acknowledged, particularly since the Restoration, that there is no power in the state superior to the royal prerogatives: the acts of the king are therefore subject to no examination, and the king is not personally responsible to any tribunal: hence the maxim, The king can do no wrong. Yet there is sufficient provision for confining the exercise of the royal power within the legal limits. 1. All royal acts are construed in accordance with the laws, and it is taken for granted that the king can never intend anything contrary to law. 2. The counsellors of the king are responsible for the royal acts, and, as well as all those who are concerned in the execution of them, are liable to impeachment and examination, without the right of defending themselves by pleading the royal commands. This system of responsibilities is the main pillar of the British constitution, and nowhere is respect for the person of the monarch so admirably united with the security of the subject as in Britain. In this way royal orders which are in violation of the law are set aside either by a recurrence to express limitations, or on the ground that the sovereign was deceived. 3. The Parliament and the judicial tribunals have also the right to discuss freely such royal acts, and, in particular, Parliament and each individual member of the upper house, has the right to make remonstrances to the crown. Every peer of the realm is by birth a counsellor of the crown, and as such has a right to demand a private audience, for the purpose of expressing his opinion on subjects of national concern. For the case of an attempt on the part of the crown to subvert the constitution, the English law can make no provision, since the maxim that the king cannot even think any wrong bars the possibility of such a supposition. An open and direct attack on the constitution implies in itself an abdication of the crown; but as to what particular act constitutes such an attack, no precedent exists. 'If any future prince,' says the loyal Blackstone, 'should endeavour to subvert the constitution by breaking the original contract between king and people, should violate the fundamental laws, and withdraw himself out of the kingdom, such a conjunction of circumstances would amount to an abdication, and the throne would thereby be vacant.' 4. Individuals are protected from any abuses of the royal power by the Habeas Corpus Act (which see), the liability of the agents to prosecution, the right of complaining to Parliament, and the liberty of the press.

B. *The Parliament* is defined to be the legislative branch of the supreme power of Great Britain (although it has been shown above to exercise both executive and judicial functions), consisting of the king, the lords spiritual and temporal, and the knights, citizens, and burgesses, representatives of the commons of the realm. The term is, however, often confined to the two houses, and it is in this sense that we shall use it. We have already spoken of the general assembly, or great council of the realm, of the Saxon period. The origin of the British Parliament has been traced to these Saxon assemblies; but it cannot be denied that it acquired a new form in the Norman times, when the sovereign summoned the chief of his immediate vassals three times a year, at Christmas, Easter, and Whitsuntide, to consult about the public affairs of the kingdom. In the reign of Henry III., Simon de Montfort, earl of Leicester, assembled a parliament, fixed on a more popular basis than any which had been previously summoned. Besides the barons of his own party, and several ecclesiastics who were not immediate tenants of the crown, he ordered returns to be made of two knights from each shire, and of deputies from the boroughs. This period (1265) is commonly esteemed the beginning of the House of Commons in England; and if, as some think, this was rather a revival of an old custom than an innovation, it is certain that it was continued by Henry III. after his liberation and restoration to power by the battle of Evesham. These estates often sat together; but, in difficult cases, each estate, the prelates, barons, and knights of the shire with the burgesses, sat by itself; but even in this case they gave their answer in common. In the reign of Edward III. (1327–77) the separation of the three estates into two houses—the House of Lords, consisting of the lords spiritual and the lords temporal, and the House of Commons, consisting of the knights, citizens, and burgesses—became settled. The lords spiritual, the archbishops and bishops, are supposed to hold certain ancient baronies under the king, William I., the Conqueror, having changed the spiritual tenure *frank-almoigne* into the feudal or Norman tenure by barony, which subjected their estates to all the feudal charges from which they were before exempt. Previous to the dissolution of the monasteries by Henry VIII. there were also 26 mitred abbots and 2 priors, which made the whole number 54, the number of lords temporal being at that time but 106. The lords temporal consist of all the peers of the realm; some of them sit by descent, as do all ancient peers; some by creation, as do all new made ones; and others, since the union of Scotland and Ireland, by election. All the peers were not originally entitled to a seat as a matter of right, but only those who were expressly summoned by the king. The number is indefinite, and may be increased at the pleasure of the crown, which, however, cannot deprive a peer of the dignity once bestowed. In the reign of Queen Anne, twelve new peers having been created at once, a bill was introduced, and passed the House of Lords, in the reign of George I., for restricting this prerogative of the crown, but the bill was thrown out in the House of Commons, whose

leading members are naturally desirous of keeping open the avenues to the peerage. No king has made such frequent use of this prerogative as George III. From 1760 to 1820 were created 2 dukes, 16 marquises, 47 earls, 17 viscounts, and 106 barons, in England alone, without reckoning the Scottish and Irish titles. The whole number of English peers at the end of his reign (February, 1820) was 291. By the act of union with Scotland, 16 representatives of the Scottish peerage are elected by the Scottish nobility for each Parliament's duration, and 28 are elected for life by the peers of Ireland; so that the whole number of lords temporal was 335. On the union with Ireland, 4 lords spiritual were also added from the clergy of that country, who sat in the House of Lords until the disestablishment of the Irish Church (January 1, 1871). The whole number of the House of Lords was therefore, inclusive of the 2 English archbishops and 22 bishops, at that time 363. It is at present 478. In the first Parliament of Henry VIII. the whole number of the House of Commons was 298; 360 were afterwards added by statute or by the king's charter creating new or reviving old boroughs. These were, by statute, the 24 burgesses and knights for Wales, 2 for the county and 2 for the city of Durham, 2 for the county and 2 for the city of Chester; 45 for Scotland and 100 for Ireland, by the acts of union with those kingdoms; and the remainder by charter. The House of Commons, therefore, as formerly constituted, was as follows:—

In the first Parliament of Henry VIII.	298
Created since by statute	168
Created or restored by charter	192
	658

Of these 658 members, 513 were for England and Wales, 45 for Scotland, and 100 for Ireland. The number of places which sent members, and the number of knights, citizens, burgesses, and barons sent by the several cities, counties, boroughs, and places, were as follows:—

117 Counties,	England,	40	2 each	80	Knights (called, also, in Scotland, *commissioners*) of the shires,	186
	Ireland,	32		64		
	Scotland,	27	1 each	27		
		6	3 altern. 1 each	3		
	Wales,	12	1 each	12		
32 Cities,	England,	23	2 each	46	Citizens,	60
		1		4		
	Ireland,	2	2 each	4		
		5	1 each	5		
	Scotland,	1		1		
222 Boroughs,	England,	165	2 each	330	Burgesses,	396
		1		4		
		5	1 each	5		
	Ireland,	26	1 each	26		
	Scotland,		14 distr. 1 each	14		
	Wales,	10	1 each	10		
		1		2		
3 Universities,	England,	2	2 each	4		
	Ireland,	1		1		
8 Cinque Ports,	England,		2 each	16	Barons,	16
382 Places			chose		Members,	658

In England, London was the city sending 4, Weymouth-cum-Melcombe-Regis was the borough sending 4. In Scotland, Edinburgh was the city sending 1. In Ireland, Dublin and Cork were the cities sending 2. Oxford, Cambridge, and Dublin were the universities. The distribution of these members was proportioned neither to population nor property. Many of the boroughs (which see) were entirely gone to decay. These were called *rotten boroughs*, and the right of election appertained to a few houses (as, for example, Old Sarum, consisting merely of the ruins of a castle, had the election of 2 members of Parliament belonging to seven holders of certain pieces of land, and depending on the Earl of Caledon), or was entirely in the hands of a single family. In several large towns the right of suffrage belonged only to the freeholders, or to certain burgage tenures, so that the number of electors was very small. These voters were mostly under the influence of some great family, and in this way about twelve families alone commanded more than 100 seats in Parliament. Thus, the Earls of Mount Edgecombe and Fitzwilliam, and the Dukes of Bedford and Devonshire, returned each 6 members; the Pelhams (Dukes of Newcastle, Earls of Chichester, and Lords Yarborough), 15; the Duke of Norfolk, 10; the Earl of Lonsdale, 10, &c. For the few places that were in the hands of independent voters, a shameless system of bribery existed, in spite of the prohibitory laws, and the prices of votes were generally well known: a seat for a small place cost about £5000. On the other hand, some principal cities had no representation; and the cure of this evil was the great object of the friends of parliamentary reform. In its actual composition, therefore, the House of Commons was but too easily influenced by the administration, which had thus been sometimes enabled to sustain for a long time a policy opposed to the national opinion and the general welfare. This was long felt and complained of by a large majority of the nation; but many obstacles of interest and ambition were thrown in the way of its reform. When, however, the Whigs came into power in 1830, they found themselves driven by the voice of the people to adopt some method for extending its constituency. On the 1st of March, 1831, the ministerial plan of reform in the representation was accordingly brought forward by Lord John Russell; and, after a debate of seven days, leave was given to bring in three bills for reforming the representation of England, Scotland, and Ireland. After a debate of two days the second reading of the bill for England was carried by a majority of 302 to 301, on the 22d. April 18, on the motion of Lord John Russell that the house resolve itself into a committee on the Reform Bill, General Gascoyne moved, that, in the opinion of the house, the number of representatives for England and Wales (which, by the bill, would be seventy less than before) ought not to be diminished. This motion being carried against ministers, after a debate of two nights, by a majority of 299 to 291, Parliament was dissolved on the 22d. The new Parliament assembled on the 14th of June, and on the 24th Lord John Russell obtained leave to bring in a bill for reforming the representation. This bill, which in many respects differed from the former, and in which, in particular, the diminution of the number of members was abandoned, finally passed the house, after long and warm debates, on the 21st September, by 349 to 236, but was rejected by the Lords by a vote of 199 to 158. On the 20th of October the Parliament was prorogued; and being again opened on the 6th of December, Lord John Russell, for the third time, introduced a reform bill, which passed the Commons on the 23d of March: in the Lords, however, ministers being left in the minority, on a motion to amend by Lord Lyndhurst (May 7), Earl Grey advised the creation of such a number of new peers as was necessary to carry through the bill, tendering his resignation as the alternative. The latter was accepted; and Lord Wellington made an ineffectual attempt to form a ministry. The Whigs were therefore reinstated (May 18th), with the assurance of having the necessary means of carrying the measure. The bill then passed the Lords by a vote of 184 to 22, a portion of the opposition having withdrawn their resistance, rather than force ministers to make

a large creation of new peers; and on the 7th of June it received the royal assent. Separate acts were passed for amending the representation of Scotland and that of Ireland. By the act for England, the county members, or knights of the shire, were increased from 94 to 159. Besides the great change thus effected in equalizing the distribution of members in the counties (as each county before returned two knights, except Yorkshire, which returned four), the qualifications of the voters were also modified, so as (in addition to the forty shillings freeholders) to extend the county franchise to—1. Copyholders for life, or a longer term of lands or tenements of the clear yearly value of £10 over rents and charges; 2. Lessees or assignees of tenements for the unexpired residue of a term of not less than sixty years, of the yearly value of £10 above rents and charges; or for the residue of a twenty years' term of the yearly value of £50; but any sub-lessee or assignee of any under lease must be in actual occupancy; 3. Occupiers as tenants of lands or tenements at a yearly rent of at least £50. In the case of freeholds and copyholds possession for six months, in the case of leaseholds for twelve months before the last day of July in the year in which the voter is registered, was made a necessary condition. By the changes which were thus made in the representation of cities and boroughs, fifty-six rotten boroughs were wholly disfranchised; thirty boroughs were deprived of one member; and one borough (Melcombe-Regis cum Weymouth) of two members; twenty-two boroughs were created in England, to return two members each; and nineteen boroughs to return one member each. Besides taking away the right of election from a stone wall in one place, from a green mound in another, and a ruined house in a third, and vesting it in large, or at least in tolerably numerous constituencies in new boroughs, the act introduced something like uniformity in the qualifications of the voters of the old boroughs and cities, and extended the elective franchise from close corporations, or privileged bodies, to the citizens at large. It gave the right of voting in the elections to every male person of full age, not subject to any legal incapacity, who occupied in the city or borough, as owner or tenant, any house, warehouse, counting-house, shop, or other building, of the clear yearly value of not less than £10, provided such person should have paid the poor rates and assessed taxes, have occupied for twelve months next previous to the last day of July in the year in which registration is sought, and have resided for six months next previous to the last day of July in the city or borough, or within 7 miles. The boundaries of the cities and boroughs were settled anew by a supplementary act of Parliament.

The following summary will show the distribution of members among the counties, cities, and boroughs of England, Scotland, and Ireland, according to the Reform Bill of 1832.

Summary of Reformed House of Commons.

England,	26 counties, 4 each; 7, 3 each; 6, 2 each; Yorkshire, 6; Isle of Wight, 1,	144	471
	133 cities and boroughs, 2 each,	266	
	53 boroughs, 1 each,	53	
	City of London,	4	
	Universities of Oxford and Cambridge, 2 each,	4	
Wales,	3 counties, 2 each; and 9 counties, 1 each,	15	29
	14 districts of boroughs, 1 each,	14	
Scotland,	33 counties,	30	53
	Edinburgh and Glasgow, 2 each,	4	
	19 boroughs and districts of boroughs, 1 each,	19	
Ireland,	32 counties, 2 each,	64	105
	6 cities, 2 each; 27 boroughs, 1 each,	39	
	The University of Dublin, 2,	2	
	Total,		658

From 1832 up to 1854 no further steps were taken in the matter of parliamentary reform. In the latter year a bill for the extension of the suffrage was introduced by Lord John Russell, but was withdrawn on the outbreak of the Crimean war. In 1859 a reform bill was brought in by Mr. Disraeli, but was thrown out; and in the following year another, introduced by Lord Palmerston's government, was withdrawn. The government of Mr. Gladstone in 1866 again took up the subject of reform, but being defeated on a division, resigned, and the task was thus left to the Conservatives. On the 18th March, 1867, Mr. Disraeli, then chancellor of the exchequer, introduced his Bill for Amending the Representation of the People, which, after undergoing so many modifications in its progress through Parliament as to be almost recast, received the royal assent on the 15th August. By this bill the borough franchise is conferred on all householders who have resided in the borough for twelve months previous to the last day of July in any year, and have been assessed for and have paid poor rates; and on all lodgers who have occupied for a like period lodgings of the yearly value of £10, unfurnished. In counties the franchise is bestowed on occupiers as owners or tenants of subjects of £12 ratable value, and the copyhold and leasehold franchise is reduced to £5. This bill related only to England and Wales; the Scotch and Irish reform bills were passed the following year, and the changes effected by them are mentioned below. This extension of the franchise caused an enormous increase in the number of electors, especially in the borough constituencies, to which were added not less than 700,000. In these a large proportion of the new voters consist of working men, so that in the manufacturing districts, and in many of the larger towns, the power of returning the members has been transferred to them.

Twelve of the English counties are further divided by the act, each new division returning two members. Out of North Cheshire and South Cheshire there is created Mid Cheshire. Out of North and South Derbyshire East Derbyshire. Out of North and South Devonshire East Devonshire. North Essex has been divided into North-west and North-east Essex. From West Kent Mid Kent has been taken. From North Lancashire North-east Lancashire; and South Lancashire has been divided into South-east and South-west Lancashire. Out of North and South Lincolnshire a Mid Lincolnshire has been carved. East Norfolk is divided into North-east and South-east Norfolk. From East and West Somerset a Mid Somerset has been gained. South Staffordshire is divided into West Staffordshire and East Staffordshire. A Mid Surrey has been won from East Surrey. Finally, the West Riding of Yorkshire is now divided into a northern, a mid, and a southern division.

Four boroughs were disfranchised for bribery, namely, Totness, Reigate, Yarmouth, and Lancaster; while thirty-eight boroughs which formerly returned each two members, but which had a pop. under 10,000 in 1861, lost a member each. Manchester, Liverpool, Birmingham, and Leeds are in future to return three members instead of two, as heretofore; but no elector is to be allowed to vote for more than two candidates. The Tower Hamlets is divided into two boroughs: the Tower Hamlets, to consist of the parishes of St. George's-in-the-East, and Mile-end Old Town, Poplar, Stepney, and Whitechapel unions, and the liberty of the Tower; and Hackney, comprising the parishes of Hackney, Bethnal Green, and Shoreditch. Merthyr Tydvil and Salford are each to return two members instead of one. The new boroughs are ten in number, namely, Chelsea, Dar-

lington, The Hartlepools, Stockton, Barnsley, Staleybridge, Wednesbury, Middlesborough, Dewsbury, and Gravesend. Each is to return one member, except Chelsea, which is to return two. The University of London is also to return one member.

Representation of Scotland.—From the time of the legislative union of Scotland with England in 1707 till 1832, the former had returned forty-five members to the British House of Commons, thirty for the thirty-three counties, and fifteen for fifteen districts of burghs, which comprised sixty-six towns or burghs. But the right of voting for members had heretofore been extremely limited. By the Scottish act of 1681 the right of voting was conferred on persons infeft in property or superiority of lands of 40 shillings old extent, or £400 Scots value rent, which was always understood to mean that superiors or persons holding directly from the crown had alone the right of voting, as before mentioned. The number of freeholders or voters in 1825 was 3066. The number in 1811 was only 2429. In 1796 the number of real voters in the Scottish counties was estimated at 1390. In two counties there were only three real voters in each, and in seven not more than ten. The nominal and fictitious voters were said to amount to 1202. The number of persons who actually voted at the elections of the burghs was very inconsiderable, consisting, in general, of the magistrates and town council, amounting only to twenty in each burgh, or in all the sixty-six burghs to 1320. By the Scots reform act eight members were added to the representation of Scotland; and the representation was distributed as follows: To the thirty-three counties, thirty members; to Edinburgh and Glasgow, two each; to Aberdeen, Dundee, Greenock, Perth, and Paisley, one each; and to fourteen districts of burghs, one each; total, fifty-three. The right of voting was also placed as near as possible on the same footing as in England; but the number of members, though increased, is not in proportion with the constituency of England or even Ireland. The old class of voters were still allowed to retain their rights, but superiorities acquired since 1831 were not to be held sufficient to confer the franchise. The newly-admitted constituency consisted of proprietors of lands or other heritable property of the yearly value of £10; of leaseholders, whether occupiers or not, the value of whose yearly interest amounted to £10 clear; of leaseholders for nineteen years whose yearly interest was not less than £50; of tenants in occupancy at a yearly rent of not less than £50; and of tenants who had paid £300 for their interest in their holdings in one sum. The burgh franchise, which had previously been in the hands of the town councils and their delegates, was now conferred on owners or occupiers of houses, &c., of £10 yearly value, as in England. By that act the constituency in Scotland in 1866 amounted to 50,354 for the counties, and 57,376 for the burghs; total, 107,730. By the Scotch reform bill of 1868 the burgh franchise is assimilated to that of England; in counties the occupation tenure is '£14 or upwards, as appearing on the valuation rolls' of the county, and all the other provisions are substantially the same. Seven additional seats are given, viz. one to the Universities of Aberdeen and Glasgow; one to those of Edinburgh and St. Andrews; one to Glasgow city, which now returns three members, though electors may not vote for more than two; one to Dundee, which now has two members; and one to each of the counties of Lanark, Ayr, and Aberdeen, which are divided, Lanark and Ayr into north and south, Aberdeenshire into east and west, each division returning one member. The counties of Selkirk and Peebles are united, and the member thus lost is given to the new district of burghs, Hawick, Selkirk, and Galashiels. To make room for these additions the English boroughs of Arundel, Ashburton, Dartmouth, Honiton, Lyme Regis, Thetford, and Wells have been wholly disfranchised.

Representation of Ireland.—Since the legislative union with Britain in 1801 Ireland had sent 100 members: sixty-four for the thirty-two counties, two each; for the cities of Dublin and Cork two each; for thirty-one other cities and boroughs one each; and one for Dublin University. By the Irish reform act five members were added, one to each of the towns of Belfast, Galway, Limerick, and Waterford, and one to the university. The following were the classes of county voters admitted (the £10 freehold franchise being conferred by the act of 1829):—the £10 copyholders; the lessees or assignees having a clear yearly interest of £10 on the residue of a lease originally for sixty years, or of £20 on a lease of not less than fourteen years, whether occupiers or not; sub-lessees or assignees in actual occupancy in the above two cases; immediate lessees or assignees having a £10 yearly interest in a £20 lease, and actually occupying. In 1850 occupiers of land rated at £12 a year were admitted to vote. In the borough franchise the £10 qualification for owner or occupant was adopted in the reform of 1832, much the same as in England; and by the act of 1850 the franchise was further extended to £8 occupiers. By the reform bill of 1868 the occupation franchise in towns is reduced from £8 to £4, and for lodgers it is fixed at the same as in England and Scotland. No alteration is made in the distribution of seats.

The following is a summary of the distribution of members among the counties, cities, and boroughs, according to the reform acts of 1867 and 1868:—

England,	15 counties with 4 members each, 10 with 6 each, 7 with 3 each, 4 with 2 each, Lancashire 8, Yorkshire 10, Isle of Wight 1,	172	463
	89 cities and boroughs with 2 each, 92 with 1 each,	270	
	Manchester, Liverpool, Birmingham, and Leeds, with 3 each,	12	
	City of London,	4	
	Universities of Oxford and Cambridge 2 each, of London 1,	5	
Wales,	3 counties 2 each, and 9 counties 1 each,	15	30
	13 districts of boroughs 1 each, Merthyr Tydvil 2	15	
Scotland,	33 counties,	32	60
	Cities and burghs 26, universities 2,	28	
Ireland,			105
			658

The number of county electors in England and Wales in 1871 was 800,314; of city and borough electors, 1,294,167. In Scotland the county electors were 79,750; the city and burgh electors, 171,912. In Ireland the county electors were 175,149; the city and borough electors, 48,358.

The Parliament is not permanent, but it is the royal prerogative to summon and dissolve it. It is regularly summoned by a writ or letter of the sovereign, issued out of chancery, addressed to each peer individually, and to the sheriff of each county, and of the cities and boroughs in the same. The sessions are now held in the new houses of Parliament, where each branch of the deliberative body has its chamber. The first session is opened by the sovereign, who personally sits, or, by the lord-chancellor, shows the reason of their meeting; the speech from the throne is answered by an address from each house. After taking the oath of supremacy and the oath of allegiance, the Commons choose a speaker and a committee of five persons (on the privileges of the house, petitions, contested elections, commerce, and the church); they then proceed to any other business

that may come before them. In the upper house the lord-chancellor presides; the Lords have the right of voting by proxy. Each house manages its own concerns, and any matter may be proposed in either house, except that all grants of subsidies or parliamentary aids begin in the House of Commons, and the Lords have not even the right of making an amendment to a money bill; they can only reject or accept it. As the Parliament is summoned, so it is prorogued by the royal authority, expressed either by the lord-chancellor in the monarch's presence, or by commission from the crown, or by proclamation. Both houses are prorogued at the same time. A dissolution of the Parliament is effected either by the authority of the crown, or by the demise of the crown, or by length of time. The House of Commons being chosen but for seven years, at the expiration of that time Parliament is dissolved *ipso facto*. So it determines, within six months of the death of the monarch, if not previously dissolved by the successor. It has already been mentioned that Parliament takes an important part in the executive and judicial administration; the lower house having the entire disposal of all grants of money, has the direction of all financial concerns; and there is no subject which may not be brought before it by petition, complaint, or motion of a member. The upper house is the supreme court of judicature in the nation. To this authority it succeeded on the dissolution of the *aula regia*. The barons of parliament were members of that court, and the rest of its jurisdiction being dealt out to other tribunals, the right of receiving appeals and superintending all other jurisdictions still remained in the residue of that assembly, from which every other court was derived. In civil cases it is the supreme court of appeal from the superior tribunals of the three kingdoms; but those from Jersey, &c., are brought finally before the privy-council. In indictments for treason or felony, or misprision thereof, where the accused is a peer of the realm, the House of Lords are the judges of the law and the fact; or if the trial is in the court of the lord high-steward, the peers-triers are only judges of the fact. The dignity of lord high-steward was formerly hereditary, but he is now appointed merely for the particular case. In cases of impeachment by the House of Commons the House of Lords are also the judges. All the forms of a criminal trial are then observed, and the verdict must be by a majority of at least twelve votes. Warren Hastings, governor-general of India, was tried by this tribunal on an impeachment of extortion and cruelty; Dundas (Viscount Melville), secretary of war, as guilty of high crimes and misdemeanours in the office of treasurer of the navy; and the Duke of York, as generalissimo, for the imputed sale of commissions. Still different from this judicial capacity of the House of Lords is the right of passing a bill of attainder, the consequences of which are forfeiture of property and corruption of blood; or a bill of pains and penalties, which is of a less severe character. This right can be exercised in either house (in the case of Queen Caroline the bill was passed in the upper house). Before it can take effect, however, the bill must pass through both houses, and receive the royal assent.

The Rights of the People of Britain.—The absolute rights of every Briton are by English writers reduced to three principal heads—the right of personal security, the right of personal liberty, and the right of private property. No man shall be interrupted in the legal enjoyment of his life, his body, his health, his reputation, nor limited in his personal freedom, without due course of law; nor be deprived of the free use and disposal of his acquisitions, save by the laws of the land. These rights have been asserted and confirmed from time to time by a series of acts, beginning with the Magna Charta, and ending with the Bill of Rights, which are not to be considered as the origin of these rights, but merely as the acknowledgment of their existence. Among the principal securities of British freedom are—(1) The established principle that no man's liberty can be restrained by the government further than the law allows; (2) The many offices of consequence in the civil administration, which are exercised by the people themselves, such as those of the justices of the peace, the jury, the grand jury, the offices in the municipal administration, and, above all, the right of assembling, at pleasure, for the purpose of discussion. The personal responsibility of public officers, and the celebrated Habeas Corpus Act, are great securities against arbitrary encroachment. But the chief protection is the liberty of the press.

The Administration of the Government also bears many traces of its Saxon origin. The king is the supreme head of the state in peace and war, the lord paramount of the soil, the fountain of justice and honour, and the supreme head of the church. As a constituent part of the supreme legislative power, he has the prerogative of rejecting such bills in Parliament as he judges improper to be passed. This prerogative, however, has never been exercised since the year 1692. As the generalissimo, or the first in military command within the kingdom, he has the sole power of raising and regulating fleets and armies, which, however, is virtually controlled by the necessity he is under of obtaining supplies from Parliament. As the fountain of justice, and general conservator of the peace of the kingdom, he alone has the right of erecting courts of judicature, and all jurisdictions of courts are derived from the crown. As the fountain of honour, of office, and of privilege, he has the power of conferring dignities, disposing of offices, and conferring privileges on private persons. In the foreign relations of the nation he is considered the nation's representative, and therefore has the sole power of sending and receiving ambassadors, making treaties and alliances, declaring war and making peace. The council of the king is distinguished into the privy-council and the cabinet council. The latter consists of those ministers of state more immediately in the confidence of the king, who are summoned to consult upon executive matters; their number and selection depend only upon the king's pleasure. It is generally composed of the lord-chancellor, the first lord of the treasury, the four principal secretaries of state, the chancellor of the exchequer, the first lord of the admiralty, &c. (fourteen or fifteen members), the remaining members of the ministry not belonging to the cabinet. The privy-council, the number of which is indefinite (at present about 150), is constituted by the king's nomination, and generally consists of the princes of the blood, the ministers, &c. The dissolution of the privy-council depends on the king's pleasure, and formerly took place, *ipso facto*, by the king's death. But, to prevent the inconvenience of having no council on the accession of a new prince, it was enacted in 1708 that it shall continue for six months after the demise of the crown, unless otherwise determined by the successor. The privy-council exercises original jurisdiction in some cases, as in questions between two colonies as to the extent of their charters, &c., and has an appellate jurisdiction over all the dominions of the empire, except Great Britain and Ireland.

Financial History.—The practice of borrowing money in order to defray a part of the war expenditure began in this country in the reign of William III. In the infancy of the practice it was customary to borrow upon the security of some tax, or portion

of a tax, set apart as a fund for discharging the principal and the interest of the sum borrowed. This discharge was, however, very rarely effected. The public exigencies still continuing, the loans were, in most cases, either continued, or the taxes were again mortgaged for fresh ones. At length the practice of borrowing for a fixed period, or, as it is commonly termed, upon *terminable* annuities, was almost entirely abandoned, and most loans were made upon *interminable* annuities, or until such time as it might be convenient for government to pay off the principal.

In the beginning of the funding system the term fund meant the taxes or funds appropriated to the discharge of the principal and interest of loans; those who held government securities, and sold them to others, selling, of course, a corresponding claim upon some fund. But after the debt began to grow large, and the practice of borrowing upon interminable annuities had been introduced, the meaning attached to the term fund was gradually changed; and instead of signifying the security upon which loans were advanced, it has for a long time signified the principal of the loans themselves.

Owing partly, perhaps, to the scarcity of disposable capital at the time, but far more to the supposed insecurity of the revolutionary establishment, the rate of interest paid by government in the early part of the funding system was comparatively high. But as the country became richer, and the confidence of the public in the stability of government was increased, ministers were enabled to take measures for reducing the interest, first in 1716, and again in 1749.

During the reigns of William III. and Anne the interest stipulated for loans was very various. But in the reign of George II. a different practice was adopted. Instead of varying the interest upon the loan according to the state of the money market at the time, the rate of interest was generally fixed at three or three and a half per cent., the necessary variation being made in the principal funded. Thus, suppose government were anxious to borrow, that they preferred borrowing in a three per cent. stock, and that they could not negotiate a loan for less than four and a half per cent., they effected their object by giving the lender, in return for every £100 advanced, £150 three per cent. stock—that is, they bound the country to pay him or his assignees £4 10*s.* a year in all time to come, or, otherwise, to extinguish the debt by a payment of £150. In consequence of the prevalence of this practice the principal of the debt now existing amounts to nearly two-fifths more than the sum actually advanced by the lenders.

Some advantages are, however, derivable, or supposed to be derivable, from this system. It renders the management of the debt and its transfer more simple and commodious than it would have been had it consisted of a great number of funds bearing different rates of interest; and it is contended that the greater field for speculation afforded to the dealers in stocks bearing a low rate of interest has enabled government to borrow by funding additional capitals for a considerably less payment on account of interest than would have been necessary had no such increase of capital been made. The advantages, however, now referred to are really of very trifling importance.

The public income at the revolution amounted to £2,001,855. At the death of William it had increased to £3,895,205, being nearly doubled. Of the fourteen years of William III.'s reign nearly ten were years of war. The military and naval expenses amounted to £44,847,382, being more than one-half the whole expenditure of government, and at the end of his reign the debt amounted to £16,394,702. Of the thirteen years of this reign twelve were years of war, and on the death of Queen Anne the national debt amounted to £54,145,363. The reign of George I. was undisturbed by war, which enabled the government of the time to reduce the debt by £2,053,125, so that at the accession of George II. the whole amount of the debt was £52,092,238. The first twelve years of the reign of the new king were passed in profound peace, but during the latter years of his reign the country was engaged in expensive wars. The total expense of the wars that were carried on between 1739 and 1748 was estimated at £46,418,680. The expense of the Seven Years' war amounted to £111,271,996, and the debt at the conclusion of the Peace of Paris in 1763 was £138,865,430. Between the Peace of Paris in 1763 and the outbreak of the American war in 1775 the national debt was again reduced, on this occasion by £10,281,795, thus leaving a debt at the commencement of the war of £128,583,635. To this the American war added £121,267,993, but above £10,000,000 was cancelled between the close of this war and the commencement of the French war, when the debt stood at £239,350,148. During the French war £601,500,343 of new debt was contracted, and on the 1st of February, 1817, when the English and Irish exchequers were consolidated, the total funded and unfunded debt was £840,850,491. Since then the debt has been reduced, and on the 31st of March, 1872, the whole amount of it was £736,141,900.

Besides the funded debt is a large sum due by government under the name of the Unfunded Debt. It arises from any national expense for which no provision has been made, or the provision has proved insufficient, or not forthcoming at the time wanted. During the latter periods of the French war, and a few years following the return of peace, its amount considerably exceeded fifty millions; in 1815 it was at the highest, and had reached a sum greatly beyond the entire amount of the debt at the accession of George II., being more than sixty-seven and a half millions. Of late years the amount of the unfunded or floating debt has not amounted to a tenth of that sum. The form in which it mostly exists is that of exchequer bills. These were first issued in 1696, and being intended as a temporary substitute for money during the recoinage at that period, some of them were so low as £10 and £5. There are none issued now under £100, and many of them are for £500, £1000, and still larger sums. They bear interest, at a certain rate per day, for £100; and, being distributed among those who are willing to advance their value, they pass from hand to hand like bank-notes. After a certain time they are received in payment of taxes or other moneys due to government; and the interest due on them at the time is allowed in the payment. The bank often engages to receive them to a certain extent, and thereby promotes their circulation; and the daily transactions between the bank and the exchequer are chiefly carried on by bills of £1000 deposited in the exchequer by the bank, to the amount of the sums received by them on account of government. New exchequer bills are frequently issued in discharge of former ones; and they are often converted into funded debt, by granting capital in some of the stocks, on certain terms, to such holders as are willing to accept it.

The public funds or stocks are nothing else than the public debts. To have a share in these funds is to be a creditor of the nation. The security of national faith is supposed to be superior to that of any private person; and therefore money lent to government always bears a lower interest than that lent on private security. The value of stock rises or falls in proportion to the real or supposed state of national prosperity.

Revenue and Expenditure of the United Kingdom for the Financial Years 1852-3, 1856-7, 1860-1, 1871-2.

Years.	Revenue.								
	Customs.	Excise.	Stamps.	Taxes.	Property and Income Tax.	Post Office.	Crownlands.	Miscellaneous.	Total.
1852-3....	£22,137,045	£15,746,055	£6,907,757	£3,382,351	£5,509,637	£2,373,907	£260,000	£887,919	£57,535,215
1856-7....	23,531,746	18,165,000	7,372,209	3,116,046	16,089,933	2,921,992	284,857	1,098,175	72,787,965
1860-1....	23,305,777	19,435,000	8,348,412	3,127,000	10,923,816	3,400,000	290,568	1,453,101	70,283,674
1871-2....	20,326,000	23,326,000	9,772,000	2,330,000	9,084,000	5,435,000	375,000	4,060,314	74,708,314

Years.	Expenditure.								
	Interest and Management of the Nat. Debt.				Civil List and Civil Charges.	Army.	Navy.	Collection of Revenue.	Total.
	Funded.		Unfunded.	Total Funded and Unfunded.					
	Permanent.	Terminable Annuities.							
1852-3....	£23,708,026	£3,822,856	£403,652	£27,934,534	£6,604,546	£9,879,962	£6,625,944	£4,072,670	£55,117,656
1856-7....	23,686,575	3,985,932	1,008,670	28,681,177	8,420,101	20,811,242	13,459,013	4,671,037	76,042,570
1860-1....	23,884,299	1,946,633	400,087	26,231,019	10,728,028	18,013,896	13,331,668	4,487,448	72,792,059
1871-2....	22,156,952	4,512,706	169,943	26,839,601	13,298,993	15,861,580	9,900,486	5,488,263	71,490,020

DESCRIPTION OF GREAT BRITAIN.—*Geography.*—As already observed, it occupies a kind of archipelago in the N.W. of Europe, and consists of numerous groups of islands, the principal of which are Great Britain and Ireland, separated from each other by the Irish Sea, which, near the centre, attains its greatest width of about 130 miles; but between Holyhead in Wales, and Howth Head in Ireland, in the track taken by the English packets, is not wider than 60 miles; and between the Mull of Cantyre in Scotland, and Fair Head in Ireland, narrows to about 12 miles. Great Britain, the larger and by far the more important of the two islands, is situated between lat. 49° 57′ 42″ and 58° 40′ 24″ N. It is the largest island in Europe, and the seventh largest in the world; the only islands ranking before it in this respect being Australia, Borneo, Papua, Sumatra, Niphon, and Madagascar. Its nearest approach to the continent of Europe is at its S.E. extremity, where the Strait of Dover, separating it from France, is only 21 miles broad. On both sides of the strait the distance is rapidly increased. The contour of Great Britain is so very irregular, that it seems vain to compare it to any mathematical figure. The N. part of the island in particular, exhibits on its E. coast a succession of large salient angles, while the W. coast is broken and ragged in the extreme; the land ever and anon jutting out into the sea, and the sea making deep inroads into the land, as if the two elements had not yet ascertained their boundaries, and were contending for mastery. The greatest length of Great Britain, measured on a line bearing N. by W. from Rye to Dunnet Head, is 608 miles. The breadth, necessarily modified by the numerous indentations of the coast, varies exceedingly. The longest line which can be drawn across the island, in a slanting direction, is W.S.W. to E.N.E., 367 miles from Land's End to Lowestoffe; but the longest line, measured from the W. to the E. coast on a parallel of latitude, between St. David's Head, in Pembrokeshire, and the Naze, in Essex, is only 280 miles. The breadth is least in the N. parts of the island. Between the Clyde at Dumbarton, and the Forth at Alloa, it is only 33 miles; in the Oikel, which falls into Dornoch Firth, the tide ascends till within 18 miles of the W. coast, and the remarkable chain of lochs between the Moray Firth and Loch Linnhe leaves so little land intervening between the opposite coasts that the communication left unfinished by nature has been completed by art, and now forms the Caledonian Canal. The area of Great Britain, including the groups of the Orkneys, Shetlands, and Hebrides, is about 88,774 square miles. Of these, England and Wales occupy 58,311 square miles, and Scotland and its islands 30,463 square miles.

Ireland, as already mentioned, lies to the W. of Great Britain, being separated from it by the Irish Sea, and surrounded on all other sides by the Atlantic Ocean. It nowhere extends so far as either the N. or S. extremities of Great Britain, but occupies an intermediate space between lat. 51° 25′ and 55° 23′ N., its N. extremity being on the same parallel with the central part of Ayrshire, and the town of Alnwick, in Northumberlandshire; and its S. extremity being opposite to Bristol Channel, nearly in the latitude of London. E. and W. it lies between lon. 6° and 11° W. Its shape is much more regular than that of Great Britain, and bears a considerable resemblance to a rhomboid, two sides of which are nearly due N. and S., while the other two take a slanting direction, between W.S.W. and E.N.E. The greatest diagonal of the rhomboid is between Mizzen Head, in Cork, and Fair Head, in Antrim, about 300 miles; the greatest length, measured on a meridian (nearly that of 8° W.), is 230 miles; and the greatest breadth, measured on a parallel (about 54° 25′ N.), is 180 miles. The breadth across the centre is nearly 165 miles. Owing to the compactness of its form, Ireland does not exhibit such variation of breadth as we have seen to exist in Great Britain; but the breadth, from Galway Bay to Dublin, is not 110 miles; and the shortest breadth of all, between Ballyshannon and Dundalk, is only 85 miles. One remarkable fact is that, notwithstanding the general compactness of Ireland, its opposite coasts and arms of the sea are so conveniently situated in regard to each other, that there is not a spot on its surface which is not, in some direction or other, within 55 miles of the ocean. The area of Ireland is about 32,531 square miles.

Area of the British Isles.

Names.	Area in sq. m.	Area in acres.
England	50,933	32,597,398
Wales	7378	4,721,823
Isle of Man	227	145,325
Channel Islands	75	48,322
Scotland	30,463	19,496,132
Ireland	32,531	20,819,829
Total	121,607	77,828,829

Physical Features.—We are so much accustomed to think and speak of the two kingdoms of England and Scotland, that we are apt to imagine, not merely a political, but also some great physical distinction

between them. In fact, however, there is no such physical distinction. Their frontiers, in part at least, merge insensibly into each other, and the whole must be viewed as one island, which, in regard even to physical features, is among the most interesting islands in the world. Though of comparatively limited extent, all varieties of scenery are exhibited in rich profusion on its surface, and all forms of geological structure lie within its bosom. The N. part of Great Britain is, for the most part, rugged, mountainous, and barren. To the N. of a line drawn from the Frith of Clyde on the W., to Stonehaven on the E. coast, the whole country is composed of primary rocks. Gneiss and mica slate, with numerous outbursts of granite, form lofty mountain chains, whose lower slopes are usually covered with beds of conglomerate and old red sandstone. These mountain chains maintain a remarkable degree of parallelism, their longer axis almost invariably taking a direction between S.W. and N.E. The principal chain is the Grampians, but though its mountains are the loftiest in the island, they are by no means of the first class. Their culminating points, Bennevis and Benmacdhui, are, respectively, 4406 and 4296 feet. From their N. sides snow scarcely ever disappears. These mountains, from the nature of the materials of which they are composed, frequently assume the form of peaks and frowning precipices, which, as they descend, instead of terminating at the general level of the base, are continued downwards, and become the romantic barriers of deep extensive lakes, presenting scenes in which sublimity and beauty strangely intermingle. The last range within the line already mentioned is that of the Ochils, which are much less elevated than the Grampians, and exhibit scenery of a much tamer description. They consist chiefly of porphyry and amygdaloid, in which numerous nodules of agate and carnelian are found. Instead of towering up in sterile peaks, they are generally rounded, and clothed to their summits with verdant or heathy pastures. On their S. slopes a new geological formation appears. The carboniferous system, at first with its strata almost turned on edge, and thrown into confusion by contact with masses and veins of trap, soon becomes fully developed, and stretches, with occasional interruptions, from the E. to the W. coast, over the basins both of the Forth and Clyde. The mineral treasures of this district make it one of the most important in Great Britain. A considerable part of the district to the S. is occupied by the Lead Hills, so called from the rich veins of lead by which its strata of graywacke are intersected. In earlier times, their alluvial covering embedded a more precious metal, and the mere washing of the soil is said to have yielded gold to the value of £100,000. Still further to the S. several large masses of granite occur. Coal also again appears, and forms two minor coal-fields. Towards the S.E. the most conspicuous feature is formed by the Cheviot Hills, a porphyritic range, which once formed part of the boundary between two independent kingdoms, and which sends its ramifications into both. Those which pass into England may be regarded as the commencing links of a long chain of mountains and hills, which extends, with scarcely a single interruption, along the W. side of that division of the island, forming its most important water-shed, and throwing out numerous branches, particularly those which penetrate into Cumberland and Wales, and give a somewhat modified but scarcely less attractive repetition of the magnificent scenery to which reference has been made. In the N. part of this chain, or that part to which the name of Cumbrian range is sometimes given, the most striking feature is formed by the series of romantic lakes so well known to tourists from all countries. Here granite and a species of basalt are occasionally seen, but the prevailing rocks are slates and sandstones, belonging to the silurian series. In other parts of this range trap-porphyry occurs. It forms the very summit of Scawfell, and is seen, in still more interesting circumstances, at Sotaller, in Borrowdale, where, at its contact with a bed of red unctuous clay and ironstone, occurs the celebrated vein of graphite which has long furnished the finest black-lead pencils in the world. Another largely developed rock of the same range is the mountain limestone, which, if anywhere, here truly deserves the name; inasmuch as it forms lofty mountain-masses—Ingleborough, Whernside, Pennigant, and Cross Fell being almost entirely composed of it. This limestone is often intersected by rich veins of lead. In the lengthened chain already referred to, and to the S. and W. of the Cumbrian, is the Cambrian range, spread over the greater part of Wales, and containing, among others, the highest mountain of S. Britain—Snowdon, 3571 feet. The rocks, like those of the Cumbrian range, lie low in the geological series, and consist almost entirely of slate, and different varieties of trap and porphyry. The great exception is towards the S. limits of the range, where the silurian rocks are overlaid by an extensive tract of old red sandstone, overlaid in its turn by the mountain limestone, which, like a girdle, encircles the most extensive, if not the most valuable of the British coal-fields.

To the S. of the Cambrian is the Devonian range, stretching from the Bristol to the British Channel, and though lofty enough, when viewed from the level of the sea, to present a coast of remarkable boldness, too low to deserve the name of mountainous. Here granite is extensively developed, and, often possessing the property of decomposing rapidly, furnishes the white clay called *kaolin*, of which our finest porcelain is made. The granite underlies the old red sandstone, or rather a slate which is considered to be its equivalent; and prevails to such an extent, particularly in Devonshire, as to have given its name to a geological formation, hence termed the Devonian series or system. Here the mineral treasures are tin and copper, veins of which, generally at a high angle, and in a direction from E. to W., intersect the slate and granite, and vary in width from a few inches to several feet. The different ranges now described as occupying the W. side of England, and stretching from its N. to its S. extremity, are composed entirely of primary rocks, or at least of rocks which, with the exception of the great Welsh coal-field, and another of limited dimensions on the N. coast of Cumberland, never stand higher in the geological series than the lowest strata of the carboniferous system. On proceeding E. the case is reversed, and the oldest strata which occur are identical with those which were in the previous case the most recent. Here, accordingly, secondary formations prevail, beginning with the mountain limestone or coarse quartzose sandstone, known by the name of millstone grit, on which our coal-fields are usually based, and ascending by regular gradations up to the more recent tertiary deposits. The coal-fields, notwithstanding of their incalculable economical value, occupy a comparatively limited extent of surface—an extent certainly not under-estimated at one-twentieth of the whole. A line drawn from Lyme-Regis to Bath, thence to Gloucester, Warwick, Leicester, Nottingham, and Tadcaster, and from Tadcaster to Stockton-on-Tees, has on its E. side nearly two-thirds of the whole surface of England. In the whole of this space no coal is worked. If the series of strata are regular, there can be no doubt that coal exists; but probably at a depth far beyond

the reach of any known means of excavation. The chalks, which occupy the uppermost place in the secondary formation, though in N. Britain confined to a few patches, constitute a marked feature in the geology of South Britain, where they not only compose the prevailing strata of extensive undulating tracts, but form in many places, both on the E. and S. coasts, bold and giddy cliffs, from whose white colour the ancient name of *Albion* is said to be derived. The tertiary formation, which includes all the rocks above the chalk, is of comparatively limited extent, and is succeeded by immense beds of diluvial gravels, sands, and clays, in which are found remains of the larger existing quadrupeds, several of them, like the elephant and rhinoceros, belonging to genera which now exist only in much hotter climates. Above these diluvial beds lie alluvium and other superficial deposits, the constituents of which, mainly depending on the rocks from which they have been disintegrated, determine the natural properties of the soil, sometimes giving it an almost inexhaustible fertility, and sometimes dooming it to perpetual barrenness.

Turning from Great Britain to Ireland, one of the most marked features which meet our view is the dreary expanse of bog which stretches over its interior. The surface, as might hence be inferred, is much flatter than that of Great Britain. It is not, however, by any means destitute of mountains. Of these no fewer than twenty-four exceed 2000 feet, and four exceed 3000 feet. Carn Tual, the culminating point of the island, is 3404 feet. It belongs to a great range called the Mountains of Kerry, which, in connection with the Lakes of Killarney, placed in the very heart of them, furnish scenes of grandeur which few countries can surpass. The great mountain groups consist of primary and transition rocks, and are generally situated near the coasts, which accordingly become of the boldest description. Inland behind these lofty barriers lies a vast undulating plain, occasionally penetrated and broken up by masses of primary rocks, but occupied almost throughout its whole extent by secondary formations. Of these by far the most largely developed is mountain limestone, much of it so fine-grained and compact as to furnish quarries of marble, both black and variegated, but seldom containing the rich veins of lead which usually accompany the same formation in England. The limestone is succeeded in regular gradation by the upper strata of the carboniferous system, and coal has been found to a greater or less extent in no fewer than seventeen Irish counties. In general, however, its quality is inferior. Much of it is in the form of anthracite, of which seams of remarkable purity, almost entirely composed of carbon, occur in the vicinity of Kilkenny; but the greater part of the coal raised is mere dross or culm, scarcely fit to be employed for any more important purpose than burning limestone. Still higher in the series above the coal, the upper strata of the secondary formation are considerably developed in the N., where they are capped by numerous masses of volcanic origin. The most magnificent specimen of these is the range of basaltic columns which forms the celebrated Giant's Causeway.

Rivers and Ports.—The mountain-chains which constitute the principal water-sheds of Great Britain, are generally at no great distance from the W. coast, and hence the rivers which descend from them in that direction have a short course, and are comparatively unimportant. The two great exceptions to this rule are the Clyde and the Severn. Both of them have their mouths on the W. coast, but they owe both their volume and the length of their course to a series of longitudinal valleys, which, instead of opening directly to the coast, take an opposite or parallel direction, and thus rather skirting the water-shed than flowing from it, obtain much larger supplies of water than a direct course could have given them. The former of these rivers, though of vast commercial importance, is indebted for it far less to its natural channel than to the immense sums judiciously expended through a long series of years in improving and almost creating its navigation. Considered merely as a river, it is comparatively insignificant, the whole length of its course to Dumbarton, where the frith properly commences, being not more, including windings, than 73 miles. The Severn is a much longer stream, and carries along with it a much mightier flood, which, commencing in the mountains of North Wales, proceeds S. through long valleys opened into by others which add their tributary streams, till the immense accumulated volume is poured into the Bristol Channel. To counterbalance these, the only rivers of any considerable volume of which the W. coast can boast, though it also possesses the Mersey, in commercial importance the second river of the empire, the E. coast, proceeding from N. to S., receives the Spey, Don, Dee, Tay, Forth, Tweed, Tyne, Ouse, Trent, and Thames. This list contains the Tay, in volume the first river of Great Britain, and the Thames, not much less in volume, and in navigable importance the greatest river of the world. It is remarkable that no river of importance empties itself either on the N. or S. coast. Owing to the great central flat of Ireland, its rivers usually flow on in a gently winding course, and, little interrupted by natural obstructions, are admirably fitted for navigation. Those of importance are not very numerous; but one of them, the Shannon, is understood to be the largest river of the British Isles. Within 7 miles of its source it enters Lough Allen, which is itself navigable, and after passing out of the Lough pursues a S.W. course of 214 miles, the whole of which is available for transport by smaller vessels, while from its mouth up to Limerick, a distance of 70 miles, it floats vessels of 600 tons. In numerous features this noble river bears a remarkable resemblance to the Severn. We have seen that in Great Britain the E. coast receives the greater part of its rivers. In Ireland the rule is reversed. The Liffey, more important from having the capital on its banks than from its own magnitude, is the only river on that coast deserving of notice. While both Great Britain and Ireland are thus provided with numerous streams, which ramify over their various districts, and are either themselves navigable or, when they cease to be so, furnish the means of continued navigation by acting as the feeders of canals, the coasts are scooped out into deep and sheltered bays, in some of which whole fleets of the largest ships can float and ride in safety. It is true, however, that the number of ocean harbours, properly so called, is not great, and that the E. coast of Britain in particular is so scantily provided as to make the construction of a great harbour of refuge at some central point a work of primary necessity, which must sooner or later be performed. The best of these harbours are situated on the S. coast, and most providentially at the very points where the proximity of the Continent, and the presence of a mighty rival, animated by a deadly hate, and ever on the watch to strike a blow, made it of most importance to possess them.

Climate.—The British Isles being nearly in the centre of the temperate zone, have, in common with all countries so situated, four different seasons, which merge almost insensibly into each other, but exhibit a wide range of temperature between their opposite extremes, as determined by the sun's elevation above, or his depression below, the equator. The central latitude of the United Kingdom is nearly 55° N., and

the isothermal line which passes through it indicates a mean annual temperature of 50°. The chief agent in moderating the natural climate of the British Isles is the Atlantic Ocean. Its temperature, never below the freezing point, and raised by the influx of the gulf-stream, is communicated to the winds and vapours which are wafted along its surface; and hence these winds and vapours, on reaching our coasts, combine with the colder temperature of the atmosphere and surface in forming one of a medium and mitigated description. A continual struggle is carried on between the low current of dense and intensely cold air, which comes from the frozen regions of the N., and the downward current of warm air, which is expanded and driven N. by the vertical suns of the N. tropics. In this struggle the warm air generally proves victorious, and hence the general prevalence of S.W. winds. While they blow, frost is of rare occurrence, and never of long duration in the British Isles. When the wind blows from the N., after it has passed over immense fields of ice, or from the E., where, from the limited expanse of the German Ocean, its temperature continues nearly as low as that which it had acquired in passing over the Continent, our atmosphere is rapidly cooled down, and frosts are occasionally severe. These considerations explain the only disadvantages under which the British climate labours. South-west winds, charged with vapour, bring deluges of rain; and N. and E. winds are accompanied with considerable, and too often sudden accessions of cold. East winds, in particular, prevail in spring, and not only check vegetation, but tend to produce, or, at all events, greatly aggravate pulmonary complaints. Still the advantages already enumerated far more than counterbalance the disadvantages; and the cloudless skies of South Europe, accompanied as they are with scorching heats which wither up the fields, and often make what should be the finest the least tolerable season of the year, poorly compensate for the magnificent foliage and rich verdure which, at the same season, give a peculiar charm to the British Isles.

INDUSTRY.—Great Britain, though somewhat late on entering on the career of improvement, and hence indebted to foreigners for the first establishment of more than one flourishing manufacture, ultimately succeeded in outstripping her competitors, and now confessedly leads the world in all the great branches of industry. This unexampled success is owing partly to physical, and partly to moral causes. To the former belong the vast resources of the country itself—the fertility of its soil sufficiently great to reward industry, but not to foster indolence, the comparative mildness of its climate, and the untold treasures deposited beneath its surface; to the latter belong the spirit of activity, enterprise, and independence engendered by free institutions, and the perfect security of property, guarded from foreign aggression by invincible fleets, and effectually maintained at home by good laws, fairly and vigorously administered. Another great cause of industrial prosperity may be found in the obstacles which have been removed, and the facilities afforded, by bringing all the parts of the United Kingdom into easy communication with each other, by means of roads, canals, and especially railways. On all of these sums of almost fabulous amount have been expended, and the proportion which their united lengths bear to the whole area far exceeds that of any other country. Nothing is more remarkable than the number of railways which now traverse the United Kingdom in all directions; and which, particularly in that part of the island of Great Britain which lies to the S. of the Forth and Clyde, cover the whole face of the country, and intersect one another at innumerable points. From the Statesman's Year-Book we obtain the following information regarding English railways:—From 1825 to 1850, a period of a quarter of a century from the opening of the first railway, 6621 miles of railway were constructed in the United Kingdom, being an average of 265 miles in each year. Between 1850 and 1860, 3812 additional miles were constructed, giving an average of 381 miles in each year; and between the latter year and the end of 1871, 5323 miles were constructed, being at the rate of 510 miles every year. It thus appears that at the end of 1871 there were in all 15,756 miles of railway open in the United Kingdom, which represented a paid-up capital of £552,680,107. Of these 15,756 miles, 11,230 miles belonged to England and Wales, 2538 to Scotland, and 1988 miles to Ireland. To the total paid-up capital, England and Wales contributed £461,368,616; Scotland, £64,282,911; and Ireland, £27,028,580. When compared with other European countries, the United Kingdom is seen to stand at the head in point of the actual length of railways open, the next being Germany, which, at the end of 1871, had 13,063 miles. But when the number of miles of railway in proportion to the area of the United Kingdom is compared with those of other countries, we do not occupy so high a position, for whereas the United Kingdom has only 1 mile of railway to 8 miles of surface, Belgium has 1 mile of railway to 6 miles of surface; but when England alone is compared with other countries, it again stands first, having 1 mile of railway to 5 miles of surface, which is a larger proportion than in any other country in the world.

Among the means of communication, in a somewhat different sense of the word, ought also to be mentioned the postal, including the telegraph system of the United Kingdom. In the year 1871, 917,191,000 letters were delivered in the United Kingdom, giving an average of 29 per head of population. Of these 759,329,000, or 33 for each individual, were delivered in England and Wales; 85,696,000, or 25 for each individual, in Scotland; and 72,166,000, or 13 for each individual, in Ireland. The total revenue derived from the post-office during the financial year ending March 31, 1872, was £4,680,000; and the net revenue, £2,224,000.

Since the transfer of the telegraphs to the state, which took place on the 5th of February, 1870, the telegraph system has been greatly increased by additional lines and offices, and the business of this department has increased in a still greater proportion. On the 1st of January, 1873, there were 24,363 miles of telegraph lines in the United Kingdom, or 1 mile of telegraph line for every 4 miles of surface, which is a greater proportion than any other state in the world. The total number of telegraph offices at the end of March, 1872, was 5098, and the number of messages sent in 1871 was 11,760,000, being an increase of 2,154,000 over the number of the previous year. The total revenue of the financial year ending March 31, 1872, was £755,000; and the net revenue slightly over £300.

Agriculture.—Of all branches of industry, this unquestionably demands precedence, both because the produce which it yields is greater in aggregate value than that of any other branch, and is also, by its very nature, not merely conducive to the well-being, but essential to the very existence of society. But though agriculture is at once the most useful and the earliest of arts, there is none in which improvement advances with so sluggish a pace. At the present day, however, things are much improved; and in almost every district in Great Britain where the plough can move, farming of a superior description may be seen. Instead of the slovenly manner in which, not a century

ago, all operations upon the soil were performed, new implements, many of them of recent and ingenious contrivance, now execute the work in the most efficient manner, and with the least waste of draught. Under the improved system of management, the produce of many farms has at least been doubled, and over the whole kingdom has so greatly increased, that the territory which once with difficulty supported 10,000,000, finds no difficulty in supporting 20,000,000. Part of the result, no doubt, is to be ascribed to additional lands which—formerly possessed as commons, or lying as unimproved wastes—have been brought under cultivation. But the far greater part is undoubtedly derived, not from new, but from the increased productiveness of old lands.

The following table gives a good general idea of the state of land in the United Kingdom in 1871:—

	Great Britain.	Ireland.	United Kingdom.
	Acres.	Acres.	Acres.
Under Corn Crops.....	9,675,261	2,124,079	11,333,243
„ Green and other Crops.....	3,738,180	1,511,532	5,271,398
Uncropped Arable Land.....	542,840	22,323	565,886
Clover and Grasses under rotation.....	4,369,443	1,827,733	6,236,588
Permanent Pasture, Meadow, &c.....	12,435,442	10,068,848	22,525,761

The proportion which the available land of England and Wales bears to its whole area is very high compared with the same proportion in Scotland. In England and Wales, excluding wastes of all kinds, improvable and unimprovable, and including only arable meadow and pasture lands, that proportion is seven-ninths: in Scotland it is little more than one-fourth, proving, that while the former is agriculturally one of the most favoured portions of the world, the latter is among the poorest. Ireland is in a middle state, having more than one-half of its surface available. By far the largest quantity of wheat is grown in England, 3,312,550 acres being devoted to this crop in 1871, out of a total of 3,831,054 for the United Kingdom. Of oats, England had 1,454,144 ac.; Wales, 253,672; Scotland, 1,007,891; and Ireland, 1,633,960. In addition to the crops above mentioned, several others are occasionally introduced. The most important of them are rye, cole or rape, beet-root, hops, and flax. The last already forms almost a staple crop in Ireland. The quantity of land under the plough in England is about 4,000,000 acres less than that in meadow and permanent pasture. The produce of the latter is consumed to a considerable extent in feeding farm horses; still a vast surplus remains, and exhibits, both in the mode in which it is raised, and the uses to which it is applied, a peculiar feature of English, as distinguished from Scotch husbandry. (See AGRICULTURE.) The total number of horses of all kinds in the United Kingdom in 1871 was about 2,648,223, of which Great Britain possessed 2,110,590, and Ireland 537,633. Those used solely for agricultural purposes numbered 939,693; unbroken horses and mares kept for breeding, 314,757. The total number of cattle (excluding the Isle of Man and the Channel Islands) was:—Great Britain 5,337,759, Ireland 3,973,102; sheep, Great Britain 27,119,569, Ireland 4,228,721; pigs 4,136,616, Ireland 1,616,754.

MINERALS.—Such is the mineral wealth of the British Isles, that with exception of quicksilver and gold, which, though found both in Scotland and Ireland, are too limited in quantity to repay the labour of searching for it, it is scarcely possible to mention a metal or mineral product of economical value which is not worked, to a greater or less extent, beneath their surface. Among these, the first place is unquestionably due to

Coal.—It claims precedence, not merely because the annual output of it, in regard both to quantity and aggregate value, exceeds that of any other mineral product, but because without it the other natural resources of the country, and the industry of its inhabitants, must have for ever remained in a great measure undeveloped. The coal-fields are not confined to one particular district, but occupy a series of basins sometimes touching, but more frequently at a considerable distance from each other, and extending in an irregular curve from the S. slopes of the Ochil Hills to the Bristol Channel. Under the head of *Physical Features*, reference has already been made to the carboniferous formation both of Great Britain and Ireland, and little more can now be done than glance at the localities of particular fields, and append a few important statistics. Beginning with the N. limit, we find a field commencing in the W. by great outbursts of trap, of which Stirling Castle crowns the most prominent summit, skirting the foot of the Ochils, and passing onward to the German Ocean, near St. Andrews; then turning round into the estuary of the Forth, and continuing up the left bank of that river; occupying great part of Fifeshire, a small isolated portion of Perthshire, and almost the whole of Clackmannanshire. The coal of this field is of several kinds; but the most important seams are splint, part of it of a free, open, burning quality, greatly in demand for steam navigation, from its not corroding the furnaces and boilers, and part of it admirably adapted for the blast furnace. Part of this field, immediately to the W. of Dunfermline, contains a coal which, in its richness and quality of caking, bears a resemblance to that of Newcastle, and has been worked, as ancient records prove, for at least five centuries. On the opposite side of the Forth, and almost in visible communication with the field already described, another field extends over a considerable portion of the Lothians. It furnishes the greater part of the fine fuel which is used in the metropolis of Scotland, and contains excellent seams of parrot coal. To the W., but at some distance, lie the coal basins of Lanark, Renfrew, and Ayrshire: the first famous throughout the world for the immense manufacturing establishments which it mainly has called into existence and made prosperous; the second remarkable chiefly as containing, near Johnstone, the thickest seam of coal in Scotland or (if the Dudley field be not an exception) in the British Isles; and the last, as yet imperfectly developed, but evidently destined to higher importance than it has yet attained. Immediately on passing the border, the Newcastle coal-field lies before us, extending over the greater part of the counties of Northumberland and Durham, and centering near Newcastle, which gives it its name. The proximity of this field to the sea, and the excellence of the coal, unrivalled for domestic use, early made it the great theatre of mining operations, which are there carried on to an extent, and on a scale of magnificence, which make it a world's wonder. It furnishes the larger proportion of sea-borne coal, whether to domestic or foreign ports. On the opposite coast, nearly in the same latitude, is a small coal-field, the workings of which, at Whitehaven and Workington, have been carried to a great distance beneath the sea. The next coal-field to the S. is, in many respects, the most important of all. It includes a large central space, not entirely occupied by coal, but interrupted, longitudinally, by a broad belt which consists of the lower strata of the carboniferous system, and thus forming a kind of twin fields, the one of which extends from Leeds to Nottingham, while the other has its greatest length from S.W. to N.E.,

and borders, at its E. and W. extremities respectively, on Manchester and Liverpool. It thus can boast, not only of being the seat of what has been termed the world's great workshop, but of furnishing the most essential elements both of its existence and prosperity. The only other coal-field of a magnitude similar to those already mentioned, is that of South Wales, which, though it long lay almost unknown or unheeded, has, in comparatively recent times, become the centre of some of the greatest public works of the empire. It is of an irregularly oval shape, and passing from Monmouth on the E., continues W. without interruption through Glamorgan to Carmarthen Bay, across which another field or continuation of that already mentioned stretches irregularly to St. Bride's Bay. There are several other minor fields, all of them, with exception of that of North Wales, situated near the centre of England, and thus, from position as much as from extent, possessed of great value. Their names are, the North Staffordshire, the Shropshire, the South Gloucester and Somersetshire, the Warwickshire, and the South Staffordshire. The most important on the list are, the first, North Staffordshire, from being the principal seat of the potteries; and the last two, Warwickshire and South Staffordshire; Coventry deriving its supplies from the one, Lichfield, Walsall, and Dudley from the latter, and Birmingham chiefly also from it, but partly from both. In South Staffordshire occurs the enormous seam known as the Ten-yard Coal of Dudley. It properly consists of several seams separated by very thin beds of clay called partings, and, owing to the necessity of working it in sections, is by no means so profitable as might be imagined. The output of coal in Great Britain, which in 1855 was 61,453,079 tons, had risen in 1866 to 101,630,544 tons. About a tenth of the total produce is exported, and about a fifth consumed in the manufacture of iron. The export of coal to foreign countries in 1849 was, including cinders and culm, 2,837,979 tons. The following table shows the recent progress of the coal trade:—

Tons of Coals Raised, Exported, and Retained for Home Consumption in 1865, 1868, 1870, and 1871.

	Raised.	Exported.	Retained.
1865.....	98,150,587	9,170,477	88,980,110
1868.....	103,141,157	10,967,062	92,174,095
1870.....	110,431,192	11,702,649	98,728,543
1871.....	117,439,251	12,816,434	104,622,817

The estimated value of the total output in the last-mentioned year, at the place of production, was nearly £30,000,000.

Iron.—Almost the whole of the iron ore smelted in this country is a carbonate, which is invariably found, to a greater or less extent, in all coal measures, but exhibits itself in a great variety of forms, and with very different qualities. Of our great coal-fields, none is so destitute of iron as that of Newcastle; and hence, though not a few blast furnaces are in operation there, the ores used are obtained, not from the surrounding pits, but by importation often from considerable distances. The most important iron districts of England are those of Yorkshire, especially the rich and recently developed Cleveland district in the North Riding, Shropshire, South and North Staffordshire, and South Wales. In 1830 there were no more than 16 blast-furnaces in Scotland, producing about 40,000 tons of pig-iron; in 1869 there were 130 in blast, which produced 1,150,000 tons. The principal statistics of the iron trade are given in the following table:—

Production of Pig-iron in Great Britain.

Years.	Quantities.	Value.
1868.....	tons 4,970,206.....	£12,381,280
1869.....	,, 5,445,757.....	13,614,397
1870.....	,, 5,963,515.....	14,908,787
1871.....	,, 6,627,179.....	16,567,947

Lead, tin, and copper are the mineral products next in importance to iron and coal. The value of the lead produced in the United Kingdom in 1870 was estimated at £1,452,715; of the tin, £1,299,505; of the copper, £551,309. Another important article is salt, of which the quantity obtained, chiefly from rock-salt and brine pits, has been estimated at nearly 1,000,000 tons. The locality in which salt is most extensively worked at present centres near Chester; and the supply is so great as to be inexhaustible. Quarries also exist in every part of the British Isles, except the S.E. of England. They furnish granite susceptible of a polish, which makes it fit for statuary, freestone of the purest white and most durable substance, and immense quantities of the finest roofing-slates. As to the value of the produce from quarries, little authentic information exists.

FISHERIES.—The raw materials obtained from the land of the United Kingdom having now been described, we proceed to notice those which are obtained from its waters, including under the term, not merely rivers and lakes, but bays and creeks, and immediately surrounding seas. One great obstacle to the general consumption of fresh fish has been the difficulty of transport, now much diminished by the facilities offered by railways, and it would seem that in some important inland towns, where fresh fish were previously known only as an expensive luxury, they can now be had at a price which places them within the general reach, so far at least as to afford a wholesome and grateful change of diet. The principal British fisheries are those of salmon, herring, and cod. The first is carried on chiefly in the rivers and estuaries of Scotland and Ireland; the second on all the coasts and islands of Scotland, the great centre of resort for curing being the towns of Wick, Peterhead, and Fraserburgh; the last around the N. islands and along the E. coast of Great Britain, particularly the edges of the Dogger Bank, off the coast of Yorkshire. Among minor fisheries may be mentioned those of mackerel, pilchards, oysters, and lobsters. Of these last, and indeed of all kinds of fresh fish, by far the largest consumer of the kingdom is London.

MANUFACTURES, COMMERCE, &C.—*History.*—The commerce of England began to establish itself at a period long before that of Scotland came into existence. In early periods the trade of England was that of Britain: a few historical facts, therefore, concerning English trade may not improperly introduce our account of the present state of British commerce.

Tin—which, though not exclusively furnished by England, is certainly found there in much greater quantities than in any other part of Europe—is said to have been the first article of British commerce. The Phœnicians, who left unexplored few places of the world as known to them, are said to have visited the coasts of England for the purpose of procuring tin; but the extent of this trade is unknown.

The Romans, while they possessed the island, had a cloth-manufactory at Winchester; and, though little addicted to the arts of trade, probably carried from this country such articles as they here found in abundance. During the subsequent invasions by the Saxons, Danes, and Normans, trade could not flourish; but under William the Conqueror a body of Flemish weavers settled in this island, and from this period it may be said that the staple of England was coarse woollens. The tyrannic John assumed the sole power of commerce in his kingdom, and erected corporations and monopolies wherever he thought proper, or whenever he was tempted by the offer of a sufficient bribe. Under such restraints, and while subjected to the caprice and oppression of one man, trade must have been almost annihilated. No adventure was

made, unless with the prospect of exorbitant profits. The interest of money, therefore, became extremely high; and under Henry III. we find it often to have been no less than 50 per cent. It was, however, during the reign of this latter prince, that regulations were made respecting broad-cloths, russets, &c., and fine linens were woven in England at this early period.

During the vigorous, and in some measure prosperous reign of Edward I., commerce met with some encouragement; but the true principles of trade were ill understood. In 1296 the Society of Merchant-adventurers was instituted for the purpose of improving the woollen manufactures, and encouraging the exportation of that national staple. Edward granted more protection to foreign merchants than they had formerly enjoyed; and though he still left them subject to the iniquitous law of answering for the debts and crimes of any of their countrymen, he allowed them the privilege of trial by jury, and fixed the duties on importation and exportation. The office of aulnager is likewise mentioned as existing in this reign.

Manufactures and commerce, during the weak reign of Edward II., were almost entirely unprotected. The disorders of this reign rendered property insecure, and consequently discouraged honest adventure and the exertion of useful ingenuity. That English manufactures were in a very rude state at this time appears from the fact that the wealthy men of the age often bequeathed their silk or velvet garments formally by will, as constituting a valuable part of their property. Flanders was then the only country in Europe where commerce was either understood or practised. The first great historical encouragement given to the woollen manufactures of this country was in the reign of Edward III. He protected foreign weavers, and prohibited his subjects from wearing any cloth not of English manufacture. In 1331 John Kemp, with seventy Walloon families, was invited into England, and Kendal became the metropolis of the woollen manufacture. Wool was exported to a considerable amount: but by a very absurd law the exportation of woollen cloth, as well as of wrought iron, was prohibited. The exports at this period consisted entirely of raw materials, such as wool, hides, butter, tin, lead; manufactures were almost unknown. The imports were chiefly linen, fine cloth, and wine. The value of the total exports in 1354 was £294,184, 17*s.* 2*d.* This sum was in money of that period, and reduced to the present denomination and value would be very large. It is remarkable that the value of the imported cloth, per piece, was at this time three times as great as that of the exported; it may be inferred that the quality was also greatly superior.

The troubles of the reign of Richard II.,—the care which Henry IV. was obliged continually to exert for the preservation of that authority to which his title was so lame,—the incessant military expeditions of Henry V.,—the misfortunes of Henry VI.,—and all the miseries brought upon the nation by the bloody contest between the houses of Lancaster and York,—effectually opposed the progress of arts, manufactures, and commerce. Nevertheless, some foreign merchants residing amongst us amassed great wealth. The commercial regulations of Henry VII., however well meant, were in reality destructive of national industry. Laws prohibiting the exportation of certain articles were multiplied; the number of corporations and monopolies was increased, and other restraints imposed, which tended powerfully to obstruct the national prosperity. Fine cloths, however, seem to have been much improved about this time; and in 1458 the Company of Staplers paid to the crown £68,000 sterling for the customs of staple wares.

The foreign commerce of England under Henry VIII. was confined to Flanders; and of such importance was this commerce already found, that when war broke out between the English and Flemings, it was agreed that the commercial relations of the two countries should not be interrupted. Foreign artists were now numerous in England; their superior skill and industry excited the envy of the natives, and caused the enactment of many severe and preposterous laws against aliens. The Flemings, in particular, were so numerous that 15,000 of them were expelled at one time from the city of London. The true method of encouraging commerce still remained ill understood. Monopolies and corporations were multiplied; the prices of labour and provisions were fixed by an absolute authority; sumptuary laws were enacted; and the legal interest of money was in this reign fixed at 10 per cent. The interest really required was probably much higher; but the lending of money on interest was generally esteemed unlawful, and the law by which it was permitted was repealed during the following reign. In 1557 glass was manufactured in England.

The disorders attending the minority of Edward VI., and the religious disturbances under Mary, were opposed to the commercial progress of the nation. Under Mary, however, we find a law which indicates greater liberality of views than might have been expected at this period. A law had been formerly enacted prohibiting any one from making cloth who had not served an apprenticeship of seven years. This law, during Mary's reign, was repealed: but, little to the honour of Elizabeth's penetration in affairs of trade, it was revived by Mary's successor.

Elizabeth was doubtless desirous of advancing the commerce of England, yet she certainly pursued measures of a directly opposite tendency. In particular, she exerted her prerogative in the creation and encouragement of monopolies of every description. Besides innumerable others of inferior importance, she established the East India Company in 1600—a society politico-commercial of such giant dimensions as no country ever could parallel. She confined the trade with Turkey to a company known by the name of the Turkey Company. She likewise procured from John Basilides, a Russian prince, a law forbidding all nations, except the English, to trade with his subjects; but this law was abrogated by his wiser successor. Several attempts, during her reign, were made to discover a north-west passage to the East Indies, and several colonies were founded in North America; but in these attempts and undertakings Elizabeth's subjects enjoyed her permission only, not her encouragement or aid. English manufactures were still very imperfect and were surpassed by those of every other nation. Much of our exports consisted in white undressed cloths; and the profits upon dyeing and finishing, amounting to £1,000,000 a year, were lost to us, these operations being generally performed on the Continent. The legal interest of money was fixed at 10 per cent. during this reign, while the legal interest in France was 6½ per cent.—a proof that commerce in France, at that time, flourished much more than in England.

The pacific reign of James I. imparted a degree of prosperity to the commerce of England which it had not formerly known. Her manufactures, however, were still inconsiderable, consisting, for the most part, of articles and utensils for domestic consumption. Wool continued to be a great material of national trade; and, during this reign, the exportation of raw wool was forbidden. The greater part of the cloth, however, was still exported without being dressed

and dyed—operations which it underwent in Holland. The attempts for the discovery of the north-west passage led to the discovery of Greenland; and the whale-fishing was soon thereafter carried on with some success. The trade to Spain—originally a monopoly—was now laid open, and soon augmented in an unexampled degree; but the nation, incapable of profiting by such a plain argument, proceeded no farther than to compel the monopolizing companies to extend their stock, and to render the admission of new adventurers less difficult than it had formerly been. The chief glory of James' reign in a commercial point of view, however, was the establishment of the American colonies—establishments which have founded an empire of Englishmen in the New World, and which, perhaps, more than any other cause have augmented the trade of Britain.

In 1618,	the exports of England amounted to	£2,487,435
,,	the imports,	2,141,151
In 1622,	the exports were	2,320,436
,,	the imports,	2,610,315

The number of seamen engaged in the commerce of England, during this reign, is said to have been 10,000. In 1641 the customs of England were said to amount to £500,000.

The disorders which preceded the melancholy end of Charles I. rather promoted than retarded the vigour of commerce. They were the means of carrying abroad, with a fresh ardour, the energy and activity of industrious citizens; and a lucrative acquisition of external commerce became the most fertile source of both public and individual wealth. Notwithstanding the civil wars and commotions from 1640 to 1659, there appears to have been raised for the public service no less than £83,331,198, being, on an average, £4,385,850 per annum. During the period which elapsed from the death of Charles I. to the abdication of James II., improvements in manufactures and trade advanced with an unprecedented rapidity. The naval war carried on against the Dutch had curtailed the maritime power of that commercial people, and in the same proportion had added to that of England; so that the Revolution found this country a great commercial nation. The shipping was more than double what it had been left by James I.; many new branches of manufacture had been introduced; several new colonies had been established in America, and some were recovered from the power of the Dutch. In Jamaica—an island which had been taken from the Spaniards during the protectorship of Cromwell—the foundations were laid of our West Indian commerce; and the destruction of much of the Dutch influence in the East gave new encouragement to the exertions of the East India Company; and in 1670 a board of trade was instituted for the purpose of consulting on and protecting the interests of commerce.

All these conspiring circumstances were greatly favoured by the Revolution—an event which defined the rights of the prince and of the people—which insured a degree of political and religious liberty which, in practice at least, has never been surpassed—and which secured to the subjects their property as well as their personal rights. The progress of arts and commerce, and the accumulation of wealth, have, since that period, proceeded with an unremitted acceleration. Some parliamentary documents of the year 1739 assert that the total value of cloths manufactured in that year may have been £1,600,000, a sum exactly double of their value in 1699. During the eighteenth century, these manufactures had increased in the proportion of six to one; and the time which has elapsed since its conclusion has evinced a similar tendency.

Manufactures.—Taking these in the order of their importance, we begin with *cotton*. In this branch of industry Great Britain still remains a long distance ahead of all the world, a superiority which it owes partly to its position, being conveniently situated both for receiving supplies of the raw material from its chief source, the Southern States of the Union, and for sending out again supplies of the manufactured cotton to European and other countries where a demand for it exists—partly also to its great wealth in coal. The chief seat of the manufacture is in Lancashire, where Liverpool and Manchester, besides a number of other large towns, are more or less supported, directly or indirectly, by this industry. The immense importance of the cotton manufacture to this country will be understood from the fact that the total value of the cotton goods exported in 1871 was £72,821,411.

Table of the Imports of Raw Cotton, of the Exports of Cotton, and of the Amount retained for Home Consumption from 1867 to 1871.

Years.	Total Imports of Cotton.	Total Exports of Cotton.	Retained for Home Consumption.
	Lbs.	Lbs.	Lbs.
1867	1,262,536,912	350,626,416	911,910,496
1868	1,328,084,616	322,620,480	1,005,463,536
1869	1,220,809,856	272,928,544	947,881,312
1870	1,338,305,584	236,630,576	1,101,675,008
1871	1,778,139,776	368,234,160	1,409,905,616

Woollen.—This is our most ancient, and was for centuries our great staple manufacture. The flocks fed on our downs and other pastures furnished wool of peculiar excellence, and in such abundance as both supplied the home demand at a moderate price and left a large surplus for exportation. There cannot be a doubt, however, that the first great improvements were not of native invention, but were introduced by foreigners, whom either the wise policy of our sovereigns had allured, or the merciless bigotry of their sovereigns had driven into the kingdom. Though the manufacture cannot boast of an extension like that of cotton, it holds the next place to it; and, besides working up the greater part of the wool grown within the kingdom, draws largely on other countries for additional supplies, particularly on our thriving Australian colonies. In the finer broadcloths our manufacturers have formidable competitors in the Belgians, from whose forefathers we may be said to have learned this branch, and also in the Saxons; but in other woollens our position, in several branches, is at least as high as that of any other country, while in not a few our superiority is decided. The chief seat of the woollen manufacture is in England—the West Riding of Yorkshire, Lancashire, Gloucestershire, and Wiltshire being the most distinguished for broadcloths; Norfolk for worsted stuffs, Leicestershire and Nottinghamshire for woollen hosiery. Blankets and flannels have numerous localities, but for the finer qualities the West of England and several of the Welsh counties are most conspicuous. Carpets, of every quality and pattern, are extensively made at Kidderminster, Cirencester, Worcester, &c.; but those of Wilton and Axminster are so superior, as to suffer little by comparison with the celebrated fabrics of Turkey and Persia. A particular species of woollen manufacture, in which the resources of modern ingenuity are signally displayed, is that of *shoddy*. Its raw material is woollen rags, which, after various purifying processes, are reduced to their original wool, then re-spun, re-dyed, and re-manufactured. Formerly the article produced was so coarse as to be fit only for padding and similar purposes, but now, either alone or with a partial mixture of raw wool, shoddy is made into flushings, druggets, pilot and other great-coats, carpets, and table-covers, some of the last of great beauty. The principal seat of the

shoddy trade is Dewsbury, about 8 miles from Leeds. The woollen manufacture of Ireland is on a very limited scale, being confined to a few broad-cloth factories near Dublin and Cork; and a few blankets and flannels, the former in Kilkenny, and the latter at Wicklow. Scotland has made much more progress, but still bears no proportion to England. The chief seats of the Scotch woollens are Aberdeen for broadcloths, chiefly coarse, and the spinning of worsted; Kilmarnock for carpets, bonnets, and shawls; Stirling and its neighbourhood for carpets and tartans; Galashiels, Jedburgh, and also a number of small towns along the foot of the Ochils, for narrow cloths of several varieties, tartans, shawls, plaids, &c.; Inverness for tartans; and Hawick for hosiery. The value of the woollen and worsted manufactures exported from Great Britain in 1871 was £33,283,112.

Table of the Imports and Exports of Wool and the Amount retained for Home Consumption from 1867 *to* 1871.

Years.	Total Imports of Wool.	Total Exports of Wool.	Retained for Home Consumption.
	Lbs.	Lbs.	Lbs.
1867	233,703,184	90,832,584	142,870,600
1868	252,744,155	105,070,311	147,673,844
1869	258,461,689	116,608,305	141,853,384
1870	263,250,499	92,542,384	170,708,115
1871	323,036,299	135,089,794	187,946,505

Linen.—In England the spinning of flax is carried on to a great extent, but its manufacture into cloth is comparatively limited. The chief seat of the manufacture is Leeds and its vicinity, and other parts of the West Riding; also parts of Lancashire, Dorset, and Durham. A considerable quantity of damask and diaper is made at Barnsley. Linen is the great staple of Ireland, and was long, in regard to textile fabrics, the staple also of Scotland. In the former, extraordinary means were employed to foster it. It early fixed its seat in the N., particularly near Belfast, and there the great changes which have taken place in the mode of manufacture, by the substitution of spinning-mills and factories for the domestic wheel and loom, appear only to have fixed it more permanently. Almost the only form into which flax is manufactured in Ireland is plain linen, chiefly shirtings. In Scotland the manufacture assumes greater variety. Besides plain linen, it has manufactures of Osnaburgs, sheetings, sailcloth, sacking, &c.—chief seat, Dundee; and of diaper and damask—chief seat, Dunfermline. The staples of both towns are by far the most important of their kind in the kingdom; and the Dunfermline table-linens are not surpassed anywhere. Large quantities of jute are now spun in combination with flax at Dundee. The value of the linen manufactures exported in 1871 was £9,741,664.

Silk.—Here the raw material is, like cotton, entirely of foreign production, with the important difference in favour of silk, that instead of being almost monopolized, and consequently liable, in regard both to quantity and price, to be controlled by a single country, the limits of its production include an immense range, of which a considerable portion belongs to our own colonies and dependencies. This is perhaps the only great branch of manufacture in regard to which, at least in finer fabrics, we must yield the palm of superiority, and be contented with something less than equality. The number of silk-mills is considerable, and confined chiefly to England. To England likewise belong the chief seats of the silk manufacture. Paisley is almost the only town out of it in which it is carried on to a great extent; and even there the celebrated shawls of unrivalled excellence are generally a mixed fabric of silk and wool. The chief seats of the silk trade in England are the district of Spitalfields in London, Manchester, and Coventry.

Besides the manufactures already mentioned, there is a great number which, though separately of less importance, absorb immense sums of capital, exhibit many of the most wonderful specimens of human ingenuity, and give subsistence to millions of the population. First among these we may mention those branches known under the general name of hardware. Some of the articles produced are remarkable for their huge bulk and ponderous weight, while many of them are so small as to be almost microscopic. For minuter articles of hardware, reference may be made to the countless products of Sheffield and Birmingham, not excluding articles in the precious metals—plate, jewellery, and watches, made also extensively in the same towns, but nowhere in the wide world so perfectly as in London. Passing from *metals* we come to *earths*, both in the more ordinary forms of pottery, and in the form of porcelain, with its classic shapes and gorgeous colours and exquisite designs. In the district of the potteries in Stafford we see a great national interest, almost created by the enterprise and genius of a single man. Among earths, too, at least as to principal constituents, we may include glass, and the numberless forms of beauty and utility which it has been taught to assume. One branch of this manufacture—the making of stained glass—has been considerably developed of late, and has produced beautiful results in stained windows for churches, public buildings, and private residences. The principal seats of the glass manufacture are Birmingham, London, Ravenhead in Lancashire, Newcastle, and South Shields. Another manufacture, almost of equal beauty, and of more importance to civilization, is that of paper. It is of vast extent, and in its processes exhibits some of the highest triumphs which human ingenuity has yet achieved. In connection with it are various manufactures, of which it may be considered as, directly or indirectly, the parent—type-founding, printing, books, and with them literature in its various departments, engraving, &c.

Trade and Commerce.—Of the extent of the commerce carried on by railway, river, canal, and high way we have little or no means of forming an estimate. Even in countries where all the districts and towns are hemmed round with officers to levy custom on every article which may be brought into them, such statistics are extremely difficult to obtain, and they become mere matters of conjecture in a country like ours, where not a shadow of restraint prevents us from moving about at will, and transporting both our persons and our goods throughout its whole length and breadth. Our foreign trade, or commerce properly so called, is more easily calculated, at least in its leading branches, but the magnitude to which it has attained is so great, and the strides with which it continues to advance are so rapid, that it is impossible to contemplate it without astonishment. The following table will show the rapid progress it is making, and the extent it has attained:—

Years.	Imports.	Exports.		
		British Produce.	Foreign and Colonial Produce.	Total Exports.
	£	£	£	£
1856	172,544,154	115,826,948	23,393,405	139,220,353
1867	275,183,137	180,961,623	44,840,606	225,802,529
1868	294,693,608	179,677,812	48,100,642	227,778,454
1869	295,460,214	189,953,957	47,061,095	237,015,052
1870	303,257,493	199,586,822	44,493,755	244,080,577
1871	329,855,143	222,519,777	59,860,949	282,380,726

In 1856 the imports per head of the population amounted to £6, 3*s.* 2*d.*; the exports of British produce, to £4, 2*s.* 10*d.* In 1871 the amounts were respectively £10, 9*s.* 4*d.* and £7, 10*s.* 3*d.*, showing that the increase of our commerce is out of all proportion to that of our population.

The values of the chief articles of export and import, in 1869–71, were as follows:—

Imports.

	1869.	1870.	1871.
	£	£	£
Cereals,	37,351,089	34,170,221	42,502,252
Cotton, Raw,	56,846,690	53,477,755	55,767,545
Silk, Raw,	6,812,831	8,204,993	8,915,056
,, Manufactures,	11,794,760	15,098,327	8,198,381
Sugar, Raw,	13,540,917	14,440,502	15,221,964
Tea,	10,311,465	10,097,619	11,635,641
Timber,	11,905,666	13,146,098	12,081,379

Exports.

	1869.	1870.	1871.
	£	£	£
Coals, Cinders, & Culm,	5,165,668	5,638,371	6,267,047
Cotton Manufactures,	53,021,505	56,745,210	57,760,207
,, Yarn,	14,095,449	14,671,135	15,061,204
Haberdashery and Millinery,	4,584,955	4,813,023	5,920,167
Hardwares & Cutlery,	3,736,602	3,812,386	4,022,582
Iron and Steel,	22,342,080	24,038,090	26,149,136
Linen Manufactures,	6,800,141	7,248,345	7,521,561
,, Yarn,	2,332,088	2,237,492	2,220,103
Machinery,	5,118,922	5,293,273	5,966,941
Woollen and Worsted Manufactures,	22,669,233	21,664,953	33,233,112

Real value of total imports from, and of total exports to, the various foreign countries and British possessions in 1870:—

Foreign Countries.

	Imports.	Exports.
Russia, N. Ports,	£13,365,943	£8,554,271
,, S. Ports,	7,195,184	1,516,393
Sweden and Norway,	8,590,893	3,218,171
Denmark and Iceland,	3,053,425	2,329,319
Danish West Indies,	17,007	774,045
Germany,	15,404,218	28,065,534
Holland,	14,315,717	17,303,845
Java, &c.,	259,846	902,642
Belgium,	11,247,864	8,949,154
France,	37,607,514	21,982,909
Algeria, &c.,	294,855	131,212
Portugal,	3,022,508	2,253,091
Azores and Madeira,	869,797	193,125
Spain,	6,067,018	3,113,751
Canary Islands,	431,797	250,356
Fernando Po,	86,905	23,013
West Indies,	5,362,339	2,820,411
Philippines,	1,197,945	786,373
Italy,	3,843,605	6,293,277
Austrian Territories,	1,104,662	2,073,920
Greece,	1,279,325	1,033,693
Turkey,	6,636,909	7,477,091
Walachia and Moldavia,	1,045,524	642,073
Egypt,	14,116,820	8,828,975
Morocco,	238,769	273,883
United States,	49,804,681	31,306,089
Mexico,	299,813	1,058,123
Central America,	1,054,277	379,969
Hayti and San Domingo,	230,832	401,220
New Granada (Colombia),	906,279	2,201,367
Venezuela,	81,915	147,944
Ecuador,	138,411	58,979
Brazil,	6,127,448	5,543,803
Uruguay,	999,925	835,094
Argentine Confederation,	1,486,425	2,428,182
Chili,	3,828,225	2,767,048
Peru,	4,881,075	1,853,706
China,	9,624,557	6,363,391
Japan,	96,173	1,777,293
West Coast of Africa,	1,721,632	1,163,305
Other Countries,	1,037,023	613,166
Total of Foreign Countries,	£238,425,080	£188,689,245

British Possessions.

	Imports.	Exports.
Channel Islands,	£457,389	916,138
Gibraltar,	59,673	830,120
Malta,	119,573	1,156,982
North American Colonies,	8,515,864	7,584,427
West Indies and Guiana,	5,949,199	3,639,011
British Honduras,	96,022	170,105
Australia,	14,075,264	10,735,481
British India,	25,090,163	20,093,749
Straits Settlements,	2,547,320	2,407,577
Ceylon,	3,450,974	941,344
Hong-Kong,	281,159	3,570,723
Mauritius,	871,387	499,975
Cape of Good Hope and Natal,	2,873,910	1,962,277
Possessions on the Gambia,	33,352	57,488
Sierra Leone,	68,124	252,596
Gold Coast,	300,469	421,072
Other Possessions,	43,071	151,957
Total of British Possessions,	£64,832,413	£55,891,332
Total Foreign Countries and British Possessions,	£303,257,493	£244,080,577

Shipping.—The number and tonnage of the registered sailing vessels engaged in the home trade of the United Kingdom, with the number of the men employed, were, in 1871, vessels 13,029, tonnage 972,310, men 54,441. The steam vessels engaged in the home trade were 1191, with a tonnage of 195,125, and crews numbering 12,613 men. The vessels engaged partly in the home, partly in the foreign trade, numbered 1910, their tonnage 444,747, and their crews 15,827. The sailing vessels engaged in the foreign trade were, in 1871, 6202, with a burden of 3,279,570 tons, and crews numbering 89,147 men. The steam vessels engaged in the foreign trade numbered 1066; their burden was 936,914 tons; and their crews numbered 40,323. The total number of vessels employed in the trade of the United Kingdom was thus 22,207, with an aggregate burden of 5,633,561 tons, and crews numbering in all 199,738. The total number of vessels registered as belonging to the kingdom was 25,892, of 5,694,123 tons.

Education.—The educational institutions in England consist of the Universities of Oxford, Cambridge, London, and Durham; the great public schools of Eton, Harrow, Winchester, Rugby, Charterhouse, and Westminster; the colleges belonging to the different dissenting bodies, numerous endowed grammar-schools, private academies and schools, the training institutions, and the numerous National or primary schools assisted by parliamentary grants, and under the supervision of the committee of the privy-council on education. In Scotland there are the four universities of Edinburgh, Glasgow, Aberdeen, and St. Andrews, the normal or training schools of the different religious bodies, academies and burgh schools in every town of any size, and the parish and denominational schools. Ireland has the University of Dublin, the Queen's University (comprising the Colleges of Belfast, Cork, and Galway), Maynooth College, academies and schools as in England, and the National schools. There are also numerous literary institutions in the towns, usually with valuable libraries and reading-rooms, and a great number of learned societies, such as the Royal Societies of London and Edinburgh, the British Association, the Royal Geographical Society, &c.

By the two recent Education Acts, the English act of 1870 and the Scotch act of 1872, a more satisfactory provision has been made for elementary education in both countries than had ever been made before. The former enacts that 'there shall be provided for every school district a sufficient amount of accommodation in public elementary schools, available for all the children resident in such district for whose elementary education efficient and suitable provision is not otherwise made;' and further, that

'where the Education Department, in the manner provided by this act, are satisfied, and have given public notice, that there is an insufficient amount of public school accommodation for any school district, and the deficiency is not otherwise supplied, a School Board shall be formed for such district and supply such deficiency, and in case of default by the School Board, the Education Department shall take the duty upon itself.' It will thus be seen that the English act does not require the formation of a School Board in every school district, but leaves it to the Education Department to determine whether a School Board shall be set up or not in any school district where one does not already exist. In this respect the English differs from the Scotch act, one of the clauses of which is to the effect that within twelve months after the passing of the act a School Board shall be elected in and for each and every parish and burgh. Another important point in which the English act differs from the Scotch one is, that whereas the former merely gives power to the School Boards separately to make a bye-law requiring the parents of children of such age—not less than five years nor more than thirteen years—as may be fixed by the bye-laws, to cause such children (unless there is some reasonable excuse) to attend school, the latter declares it to be the duty of every parent to provide elementary education in reading, writing, and arithmetic for his children between five and thirteen years of age; it also requires an officer to be appointed to ascertain what parents have failed in the duty above declared, and to keep the School Board constantly informed upon that point, and empowers the School Board to summon the parent to explain failure in this duty, and in case of no satisfactory explanation being given, to prosecute such parent before the sheriff. This provision also applies to guardians and employers of children between the ages specified. The Scotch act, after declaring that the Scotch Education Department is to mean the Lords of any Committee of the Privy Council appointed by Her Majesty on education in Scotland, also establishes an Education Board of five members for Scotland, to sit in Edinburgh, and to endure for three years with possible prolongation of not more than two years, after which its duties are to devolve on the Education Department. Its duties are generally to see that the provisions of the act are carried out. A special provision is made by the English Education Act for the metropolis. In this case the formation of a school board is made compulsory, and the metropolis is divided into ten school districts, namely, the City, Marylebone, Finsbury, Lambeth, Tower Hamlets, Hackney, Westminster, Southwark, Chelsea, and Greenwich, each of which sends a number of members to the School Board, the number in each case being fixed by the Education Department. These are the most important respects in which the two acts differ; there are other provisions in which they agree. Of these, the chief are, first, that parents shall be allowed to withdraw their children from any instruction in religious subjects, and from any religious observance in a public school, and that the children shall not lose any of the other benefits of the school by being so withdrawn; and secondly, that public schools shall be examined by government inspectors, but that religious subjects shall form no part of such inspection.

In 1870 there were 8986 inspected schools in England and Wales, capable of accommodating 1,950,641 children, and having an average attendance of 1,255,083; in Scotland in the same year the number of inspected schools (exclusive of Roman Catholic schools) was 1963, with accommodation for 264,594, and an average attendance of 198,448. In 1871 the number of inspected schools in England and Wales had increased to 9521, affording accommodation to 2,092,984 children, and having an average attendance of 1,345,802; in Scotland the number of schools had somewhat diminished, being only 1944, with accommodation for 264,041 children, but the average attendance had increased to 201,393. The totals for Great Britain for each of the two years were thus—in 1870, schools, 10,949; accommodation, 2,215,235; average attendance, 1,453,531: in 1871, schools, 11,465; accommodation, 2,357,025; average attendance, 1,557,195. As was to be expected, the expenditure in connection with popular education has greatly increased since the passing of the English act. The annual parliamentary grants, which in 1840 amounted to £30,000, had risen in 1850 to £180,110, in 1862 to £774,743, in 1870 to £914,721, and in 1872 to £1,551,560. It is thus seen that during the ten years between 1862 and 1872 the grant doubled itself, and its increase in future years is likely for some time to be equally rapid.

Army.—The most of the continental states had adopted the policy of maintaining a standing army before England. The Royal Guards were the only regular troops permanently kept up before the time of Charles I., and it was not admitted that the king had any right to raise a force larger than was necessary for this purpose, without the consent of Parliament. The control of the army was a subject of vehement dispute between Charles I. and the Parliament. Charles II. was allowed to maintain 5000 regular troops as guards. This number was increased to 30,000 by James II.; but by the Bill of Rights in 1689 it was enacted that the raising and keeping of a standing army in time of peace, without the sanction of Parliament, was contrary to law. From that time the army has existed on its present footing. It is raised on the authority of the sovereign, who is looked on as its head; but the number of troops to be maintained, and the cost of the different branches, are regulated annually by a vote of the House of Commons.

At the close of the French war in 1814, the army immediately belonging to the empire, and exclusive of foreign troops in British pay, amounted to 897,479 men, viz.:—

Regular troops	226,367
Regular militia	93,219
Army of India (including 20,000 British soldiers),	213,454
Local militia of Great Britain	196,446
Volunteers in Great Britain	88,000
Militia and Yeomanry in Ireland	80,000
Total	897,479

If to the above troops were added the number of foreign troops and subsidiaries in the pay of Great Britain at that time, the total military force of the empire must have exceeded 1,000,000 of men. The following tabular statement shows the strength of the British army of all ranks, according to the estimates of 1872–73:—

I. Regular forces		133,649
II. Indian army		62,957
III. Home reserve forces:		
Militia	134,037	
Yeomanry cavalry	15,773	
Volunteers	172,891	
Army reserve (including enrolled pensioners)	35,000	
Total		357,701
Grand total		554,307

The total estimated expenditure on the army for 1872–73 is £14,824,500, being £1,027,200 less than the estimated expenditure of the previous year.

By the Army Enlistment Act of 1870 some im-

portant changes were made, of which the chief were the abolition of bounty and the fixing of the term of service at 12 years, the recruit having the option of passing the whole time in the army, or part in the army and part in the army reserve. If he prefers to pass the whole time in the army, he may engage for a further period of nine years, at the end of which he is entitled to a pension. Otherwise he has no such claim. No British citizen is obliged to bear arms except for the defence of his country; but all able-bodied men, from eighteen to thirty-five, are liable to militia service. The militia troops are raised, when required, by ballot.

Navy.—In many respects, and particularly as a defensive force, the army must yield to the navy. The advantages of our insular position are often talked of, as if the mere fact of living on an island were in itself a source of safety, whereas the safety is not in the position but in the ability to defend it. The public mind is happily alive to this consideration; and hence, while a large standing army is for many reasons eyed with jealousy, our navy swells every British heart with honest pride, and is confidently appealed to as a sufficient response to the cry which is sometimes heard proclaiming the defenceless state of Great Britain. A force which is thus honoured and fostered naturally attracts the best and bravest spirits of the land, and many of the brightest pages in our annals are filled with naval achievements. The total naval force of the United Kingdom in commission, and in reserve and building, was as follows at the end of September, 1872:—

	No. of Ships.	Horse-power.	No. of Guns.	Tonnage.
In commission,	230	55,210	1939	307,072
In reserve and building,	303	57,627	3141	370,811

In the vessels in commission there were serving 25,531 officers and men, besides 2854 boys and 6385 marines, making a total of 34,770. The total number of officers, seamen, boys, and marines, voted for the year ending 31st March, 1873, was 61,000. The estimated expenditure was £9,351,449. The most important and formidable portion of the navy is the armour-clad fleet, which, on the 1st of January, 1872, consisted of fifty-five vessels, including those on the stocks and three turret-ships belonging to the colonies. These vessels vary in size and construction, some being gun-boats and corvettes, with engines as low as 160 horse-power, and carrying only two guns; while others have engines of 1350 horse-power, and as many as twenty-eight guns, with armour-plates varying in thickness from 4½ up to 8 or 9 inches, and even more. Perhaps the most formidable of the iron-clads are the *Monarch*, *Glatton*, *Devastation*, and *Thunderer*. The *Monarch* has two armour-plated turrets fixed on pivots between the fore and main masts, in each of which are mounted two 25-ton muzzle-loading rifle guns throwing 600-lb. shot. The guns are raised or lowered in the turrets by means of hydraulic power. The marine force of Britain during last general war included more than 1000 vessels of all sizes, manned by 184,000 seamen. This force has since been reduced to a number proportionate to the wants of the nation. The following is a statement of the number of vessels of which the British fleet has consisted at different periods:—

		Vessels of all Sizes.
Under James II.		173
William III.		273
Anne		234
George I.,	1721	206
George II.,	1734	208
George III.,	1762	343
	1793	268
	1812	984
Victoria,	1856	793

There are six great marine arsenals for the supply of the royal navy:—Woolwich, Chatham, Sheerness, Portsmouth, Plymouth, and Pembroke. The exterior ports, as they are called, are Deal, Harwich, and Leith. The principal foreign stations are those of Gibraltar, Malta, Halifax (N.S.), Quebec, the Bermudas, Jamaica, Antigua, Cape of Good Hope, Trincomalee, and Bombay. The number of officers, seamen, boys, and marines, voted for the navy for the year 1870–71, was 55,430.

Religion.—See ENGLAND—Church, and SCOTLAND—Church.

Extent of Empire.—Besides the island of Great Britain, the European dominions of the empire include Ireland, the Isle of Man, and the other smaller islands contiguous to the coasts of these, with the islands of Jersey and Guernsey, and the adjacent isles, in the British seas, nearer the coast of France; the fortress of Gibraltar and the isle of Malta, with the small dependent island of Gozo, in the Mediterranean.—In *Asia*, Britain possesses Hindoostan, Ceylon, and various other islands in the Indian Ocean, and the Oriental Archipelago; comprising a vast extent of territory, and a population several times greater than that of her native dominions.—In *Africa* she holds the Cape of Good Hope, Natal, Sierra Leone, and other settlements on the western coast, with St. Helena and other islands in the Atlantic Ocean.—In the *New World* she rules over Canada, and the regions round Hudson's Bay, with Nova Scotia, New Brunswick, British Columbia, and Vancouver's Island, and the islands of Newfoundland, Cape Breton, Prince Edward's Island, and Anticosti. To these must be added the numerous colonies in the West Indies, and the extensive and valuable colony of Guiana in South America. The possession of the island continent of Australia, and the adjacent Tasmania, with New Zealand, the Britain of the south, has thrown open vast additional fields for her surplus population, and has almost created a new world in the southern hemisphere. Thus her authority extends over two-thirds of the globe, in reference to longitude; and it may therefore, without hyperbole, be said, that the sun never sets upon her possessions; for, within this vast range, various places have noon and midnight at the same moment. Stretching also, with the exception of a few intermediate spaces, from the arctic circle to the thirty-third degree of s. latitude, the four seasons are experienced within her dominions at the same time. The colonies of Britain, therefore, spread themselves through every climate, and yield every variety of natural product.

The increase of Britain's colonial possessions, in population, wealth, and trade, has been something prodigious within the last few years. In Canada and Australia, especially, material progress in prosperity has been really marvellous. By recent annexations, again, in our East Indian empire, there remains scarcely a native power that can set up a pretension to independence, or much less cope with us. Perhaps our least progressive colonies are those of the West Indies, insular and continental. As for our sway in North America, whatever it may have been in past centuries, it has been of the highest order of beneficence in the present age. Complaints of misgovernment have come fitfully from the distant and less satisfactorily settled Australasia; but as the mother country has now conceded self-government to every one of her considerable colonies, the ground will for the future be cut from under the feet of all redoubtable opponents of her gentle sway.

The area and population (in most cases that of 1871) of the different countries of which the British Empire is composed, are exhibited in the following table:—

Area and Population of the British Empire.

Europe.	Area in sq. m.		Population.
British Isles	121,115·00	....	31,817,108
Heligoland	·21	....	1,912
Gibraltar	1·93	....	25,216
Malta and Gozo	142·73	....	146,852
Africa.			
Cape of Good Hope	223,024·00	....	682,600
Natal	18,382·00	....	315,250
Sierra Leone	468·00	....	55,374
Gambia	21·00	....	14,190
Gold Coast	16,626·00	....	400,000
Lagos	?	....	115,000
Mauritius and Dependencies	708·00	....	322,924
St. Helena	47·00	....	6,241
Ascension	35·00	....	400
Asia.			
British India	969,241·00	....	190,278,644
Straits Settlements	1,095·00	....	307,951
Ceylon	24,454·00	....	2,128,884
Hong Kong	30·00	....	124,198
Labuan	45·00	....	4,898
Aden	3·00	....	40,000

America.	Area in sq. m.		Population.
Dominion of Canada	3,481,779·00	....	3,648,000
Newfoundland	40,200·00	....	146,536
Prince Edward Island	2,178·00	....	94,021
Bermudas	24·00	....	12,121
Honduras	13,500·00	....	25,635
West India Islands	12,636·00	....	996,909
British Guiana	99,925·00	....	193,491
Australasia.			
New South Wales	308,560·09	....	501,580
Victoria	88,451·00	....	729,868
South Australia	380,602·00	....	188,995
Northern Australia	523,531·00	....	
Queensland	668,259·00	....	120,066
Western Australia	975,824·00	....	24,785
Tasmania	26,215·00	....	99,328
New Zealand	106,259·00	....	294,028
	8,093,376·87	....	233,863,005

The following tables exhibit with more detail the progress of Great Britain and Ireland during the last half century:—

Population of England and Wales.

An account showing the Population of the several Counties of England and Wales as enumerated in the years 1821, 1831, 1841, 1851, 1861, *and* 1871. *Also the number of Parishes in each County, and extent in Statute Acres.*

Counties.	Area in Acres.	No. of Parishes.	Population in					
			1821.	1831.	1841.	1851.	1861.	1871.
Bedford	295,509	123	84,052	95,483	107,936	124,478	135,287	146,257
Berks	450,132	151	132,639	146,234	161,759	170,065	176,256	196,475
Buckingham	467,009	207	135,133	146,977	156,439	163,723	167,993	175,879
Cambridge	524,926	165	122,387	143,955	164,459	185,405	176,016	186,906
Chester	705,493	91	270,098	334,391	395,660	455,725	505,428	561,201
Cornwall	869,878	205	261,045	301,306	342,159	355,558	369,390	362,343
Cumberland	970,161	105	156,124	169,262	178,038	195,492	205,276	220,253
Derby	656,243	140	213,651	237,170	272,202	296,084	339,327	379,394
Devon	1,655,161	465	438,417	493,908	532,959	567,098	584,373	601,374
Dorset	627,265	275	144,930	159,385	175,054	184,207	188,789	195,537
Durham	647,592	76	193,511	239,256	307,963	390,997	508,666	685,089
Essex	1,055,133	414	289,424	317,507	344,979	369,318	404,851	466,436
Gloucester	804,877	338	336,190	387,398	431,495	458,805	485,770	534,640
Hereford	532,898	223	102,669	110,617	113,272	115,489	123,712	125,370
Hertford	391,141	134	129,731	142,844	156,660	167,298	173,280	192,226
Huntingdon	229,515	102	48,946	53,192	58,549	64,183	64,250	63,708
Kent	1,004,984	413	427,224	479,558	549,353	615,766	733,887	848,294
Lancaster	1,207,926	67	1,052,948	1,336,854	1,667,054	2,031,236	2,429,440	2,819,495
Leicester	511,719	213	174,571	197,003	215,867	230,308	237,412	269,311
Lincoln	1,767,962	630	283,058	317,465	362,602	407,222	412,246	436,599
Middlesex	181,317	197	1,145,057	1,358,330	1,576,636	1,886,576	2,206,485	2,539,765
Monmouth	368,399	123	75,801	98,126	134,368	157,418	174,623	195,448
Norfolk	1,356,173	748	344,368	390,054	412,664	442,714	434,798	438,656
Northampton	629,912	303	163,097	179,336	199,228	212,330	227,704	243,891
Northumberland	1,290,312	94	212,589	236,959	266,020	303,568	343,025	386,646
Nottingham	526,176	212	186,873	225,327	249,910	270,427	293,867	319,758
Oxford	470,095	218	138,224	153,526	168,127	170,439	170,944	177,975
Rutland	94,889	51	18,487	19,335	21,302	22,983	21,861	22,073
Salop	841,167	217	198,311	213,518	225,820	229,341	240,959	248,111
Somerset	1,049,815	474	355,789	403,795	435,599	443,916	444,873	463,483
Southampton	1,032,105	318	282,897	313,976	354,682	405,870	481,815	544,684
Stafford	732,434	151	345,972	409,480	509,472	608,716	746,943	858,326
Suffolk	949,825	509	271,541	296,317	315,073	337,215	337,070	348,869
Surrey	483,178	144	399,417	486,434	584,036	683,082	831,093	1,091,635
Sussex	934,006	314	233,328	272,644	300,075	336,844	363,735	417,456
Warwick	566,458	201	274,482	336,645	401,703	478,013	561,855	634,189
Westmoreland	500,906	32	51,379	55,041	56,454	58,267	60,817	65,010
Wilts	859,303	303	219,574	237,244	256,280	254,221	249,311	257,177
Worcester	472,453	173	194,074	222,655	248,460	276,926	307,397	333,837
York (East Riding)	768,419	187	154,643	168,891	194,936	220,983	240,227	268,466
— (City)	2,720	48	21,711	26,260	28,842	36,303	40,433	43,796
— (North Riding)	1,350,121	192	183,178	192,206	204,701	215,214	245,154	293,278
— (West Riding)	1,709,307	196	809,363	984,609	1,163,580	1,325,495	1,527,796	1,874,611
England	32,597,398	9,942	11,281,883	13,090,528	14,997,427	16,927,883	18,954,444	21,495,131
Anglesey	193,511	74	45,063	48,325	50,891	57,327	54,609	51,040
Brecon	460,158	63	43,826	47,763	55,603	61,474	61,627	59,901
Cardigan	443,387	63	57,784	64,780	68,766	70,796	72,245	73,441
Carmarthen	606,172	76	90,239	100,740	106,326	110,632	111,796	115,710
Carnarvon	369,482	68	58,099	66,818	81,093	87,870	95,694	106,121
Denbigh	392,005	60	76,428	82,665	88,478	92,583	100,778	105,102
Flint	169,162	25	53,893	60,244	66,919	68,156	69,737	76,312
Glamorgan	547,070	125	102,073	126,612	171,188	231,849	317,752	397,359
Merioneth	385,291	34	34,382	35,315	39,332	38,843	38,963	46,598
Montgomery	485,351	52	60,245	66,844	69,607	67,335	66,919	67,623
Pembroke	393,682	141	78,788	81,425	88,044	94,140	96,278	91,998
Radnor	276,552	52	22,533	24,743	25,458	24,716	25,382	25,430
Wales	4,721,823	838	718,353	806,274	911,705	1,005,721	1,111,780	1,217,135
Grand Total	37,319,221	10,780	12,000,236	13,896,797	15,914,148	17,927,609	20,066,224	22,712,266

Population of Scotland.

An Account showing the Population of the several Counties of Scotland as enumerated in the years 1821, 1831, 1841, 1851, 1861, *and* 1871. *Also the Number of Parishes in each County, and the extent in Statute Acres.*

Counties.	Statute Acres.	No. of Parishes.	Population in 1821.	Population in 1831.	Population in 1841.	Population in 1851.	Population in 1861.	Population in 1871.
Aberdeen	1,260,625	82	155,049	177,657	192,387	212,032	221,569	244,603
Argyll	2,083,126	34	97,316	100,973	97,371	89,293	79,724	75,679
Ayr	735,262	46	127,299	145,055	164,356	189,858	198,971	200,809
Banff	439,219	23	43,663	48,337	49,679	54,171	59,215	62,023
Berwick	302,951	32	33,385	34,048	34,438	36,297	36,618	36,486
Bute	109,375	6	13,797	14,151	15,740	16,608	16,331	16,977
Caithness	455,708	10	29,181	34,529	36,343	38,709	41,111	39,992
Clackmannan	29,440	5	13,263	14,729	19,155	22,951	21,450	23,747
Dumbarton	204,800	12	27,317	33,211	44,296	45,103	52,034	58,857
Dumfries	702,953	43	70,878	73,770	72,830	78,123	75,878	74,808
Edinburgh	234,925	31	191,514	219,345	222,454	259,435	273,997	328,379
Elgin or Moray	340,000	20	31,398	34,498	35,012	38,959	42,695	43,612
Fife	328,427	62	114,556	128,839	140,140	153,546	154,770	160,735
Forfar	568,750	53	113,355	139,606	170,453	191,264	204,425	237,567
Haddington	179,142	24	35,127	36,145	35,886	36,386	37,634	37,771
Inverness	2,723,501	31	89,961	94,797	97,799	96,500	88,888	87,531
Kincardine	252,250	19	29,118	31,431	33,075	34,598	34,466	34,630
Kinross	49,812	4	7,762	9,072	8,763	8,924	7,977	7,198
Kirkcudbright	610,343	28	38,903	40,590	41,119	43,121	42,495	41,859
Lanark	568,867	41	244,387	316,819	426,972	530,169	631,566	765,339
Linlithgow	81,113	13	22,685	23,291	26,872	30,135	38,645	40,965
Nairn	137,500	4	9,268	9,354	9,217	9,956	10,065	10,225
Orkney and Shetland	598,726	32	53,124	58,239	61,065	62,533	64,065	62,882
Peebles	227,869	14	10,046	10,578	10,409	10,738	11,408	12,330
Perth	1,814,063	73	138,247	142,166	137,457	138,660	133,500	127,768
Renfrew	158,268	17	112,175	133,443	155,072	161,091	177,561	216,947
Ross and Cromarty	2,016,375	33	68,762	74,820	78,685	82,707	81,406	80,955
Roxburgh	428,494	32	40,892	43,663	46,025	51,642	54,119	53,974
Selkirk	166,524	5	6,637	6,833	7,990	9,809	10,449	14,005
Stirling	295,875	24	65,376	72,621	82,057	86,237	91,298	98,218
Sutherland	1,207,188	13	23,840	25,518	24,782	25,793	25,246	24,317
Wigton	327,906	17	33,240	36,258	39,195	43,389	42,095	38,830
	19,639,377	883	2,091,521	2,364,386	2,620,184	2,888,742	3,062,294	3,360,018

Population of Ireland.

An Account showing the Population of the several Counties of Ireland as enumerated in the years 1821, 1831, 1841, 1851, 1861, *and* 1871. *Also the number of Parishes in each County, and the extent in Statute Acres.*

Counties.	Area in Acres.	No. of Parishes.	Population in 1821.	Population in 1831.	Population in 1841.	Population in 1851.	Population in 1861.	Population in 1871.
Ulster.								
Antrim	712,565	77	262,860	314,608	360,875	361,046	378,588	419,782
Armagh	312,328	20	205,450	229,349	232,393	196,085	190,086	179,221
Cavan	466,260	30	195,076	228,050	243,158	174,071	153,906	140,555
Donegal	1,193,443	42	248,270	298,104	296,448	255,160	237,395	217,992
Down	609,811	60	325,410	352,571	361,446	319,972	299,302	277,775
Fermanagh	417,782	18	130,997	149,555	156,481	116,007	105,768	92,683
Londonderry	513,388	31	193,869	222,416	222,174	191,868	184,209	173,932
Monaghan	318,733	19	174,697	195,532	200,442	141,758	126,482	112,785
Tyrone	778,944	35	261,865	302,943	312,956	255,819	238,500	215,668
Leinster.								
Carlow	221,293	50	97,070	98,941	88,228	68,075	57,137	51,472
Dublin	226,302	107	335,892	386,694	372,773	404,992	410,252	405,625
Kildare	418,415	113	99,065	108,401	114,488	95,724	90,946	84,198
Kilkenny	507,254	127	181,946	193,024	202,420	158,746	124,515	109,302
King's County	493,019	82	131,088	144,029	146,837	112,080	90,043	75,781
Longford	257,222	23	107,570	112,391	115,491	82,350	71,694	64,408
Louth	201,396	61	101,011	108,168	111,979	107,657	90,713	84,195
Meath	578,247	147	159,183	177,023	188,828	140,750	110,373	94,480
Queen's County	424,854	50	134,275	145,843	153,930	111,623	90,650	77,071
Westmeath	433,769	62	128,819	136,799	141,300	111,409	90,879	78,416
Wexford	573,200	142	170,806	182,991	202,033	180,159	143,956	132,506
Wicklow	499,894	58	110,767	122,301	126,143	98,978	86,479	78,509
Connaught.								
Galway	1,499,210	116	337,374	427,407	440,198	322,259	271,478	248,257
Leitrim	376,212	17	124,785	141,303	155,297	111,915	104,744	95,324
Mayo	1,321,282	68	293,112	367,956	388,887	274,830	254,796	245,855
Roscommon	585,407	56	208,729	239,903	258,591	174,492	157,272	141,246
Sligo	451,086	39	146,229	171,508	180,886	128,510	124,845	115,311
Munster.								
Clare	768,265	79	208,089	258,262	286,394	212,428	166,305	147,994
Cork	1,833,921	269	730,444	812,967	854,118	648,903	544,818	516,046
Kerry	1,159,356	83	216,185	264,559	293,880	238,239	201,800	196,014
Limerick	662,972	125	277,477	300,080	330,029	262,136	217,277	191,313
Tipperary	1,048,969	186	346,896	402,598	435,553	331,487	249,106	216,210
Waterford	456,306	74	156,521	176,893	196,187	164,051	134,252	122,825
	20,322,641	2316	6,801,827	7,784,536	8,174,031	6,553,579	5,798,967	5,402,759

BRITAIN, New, the name of a group consisting of two large and several small islands in the South Pacific Ocean, lying between the parallels of 4° and 6° 30′ s. to the E. of New Guinea, and having Dam-

pier Strait to the W. and St. George's Channel to the E. The principal island, New Britain, is 300 miles long; area, 12,000 square miles. The other islands are New Ireland, New Hanover, Admiralty Islands, and some smaller ones. Some of the group are volcanic, and at the N.E. extremity of the most northerly there is a volcano in active operation. The natives are Papuas, black in colour, and having curled and woolly hair; but they have neither the thick lips nor the flat noses of the negroes. Those of the Admiralty Islands are gentle and peaceful; those of New Hanover are warlike. The islands contain some high mountains, covered with lofty trees to their summits. The bread-fruit tree, the fig-tree, pepper, aloes, nutmeg, &c., are found here. The seas abound in coral reefs, which often render the navigation dangerous. Dampier first discovered that this archipelago was separate from New Guinea. Carteret first showed that New Ireland was separated from New Britain by the strait which he called St. George's Channel.

BRITANNIA METAL, also called WHITE METAL, is an alloy that has come into very general use in modern times, many domestic utensils, such as spoons and teapots, being made of it. Such articles are commonly electro-plated, and made to resemble real silver. It consists chiefly of tin and antimony, but often contains also a small quantity of copper and zinc. It may be made by fusing together equal quantities of copper, or brass, bismuth, antimony, and tin, and adding melted tin till it acquires the requisite hardness. The following are the proportions that are sometimes employed: tin 85½, antimony 10½, zinc 3, copper 1. The French *métal argentin* is nothing else than Britannia metal. The manufacture of the metal was introduced into England about 1770. *Queen's metal* is one of the varieties of Britannia metal. It contains of tin 9 parts, antimony, bismuth, and lead 1 part each; or tin 100, antimony 8, copper 4, bismuth 1.

BRITANNIA TUBULAR BRIDGE. See BRIDGE (TUBULAR).

BRITINIANS, a body of monks of the order of St. Augustine, who received their name from Britini, in Ancona, which was the place of their institution. When Alexander IV., in 1256, effected the union of the different congregations of the order of St. Augustine, the Britinians became members of this union.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, a society first organized in 1831, mainly through the exertions of Sir David Brewster, who, in common with other eminent scientific men, had been led to lament the lack of facilities for scientific pursuits in this country, as compared with the nations of the Continent. Its first meeting was held at York, on 26th September, 1831, under the presidency of Lord Milton. Its objects are thus described in the preamble to the rules of the association: 'To give a stronger impulse and a more systematic direction to scientific inquiry; to promote the intercourse of those who cultivate science in different parts of the British Empire with one another and with foreign philosophers; to obtain a more general attention to the objects of science, and a removal of any disadvantages of a public kind which impede its progress.' This declaration is in exact conformity with the views of Sir David Brewster in founding the society. A similar institution had been established some years previously in Germany in 1822.

The second meeting of the British Association took place at Oxford in 1832, under the presidency of Dr. Buckland, and since then a meeting has been held every year up to the present time. All the principal towns of the United Kingdom have on different occasions formed the place of rendezvous, a new locality being chosen every year. The *séances* extend generally over about a week. The society is divided into sections, which, after the president's address, meet separately during the séances for the reading of papers and conference. Soirees, conversaziones, lectures, and other general meetings are usually held each evening during the meeting of the Association. The sections are: A. Mathematics and Physics; B. Chemistry and Mineralogy, including their application to Agriculture and the Arts; C. Geology; D. Biology; E. Geography and Ethnology; F. Economic Science and Statistics. Local committees are formed to arrange for meetings, &c. At first the British Association had to encounter a considerable amount of obloquy and ridicule, as a body of dreaming and fantastic visionaries, whose deliberations could only end in smoke, and tend to no practical result. A complete change soon came over the public mind in this respect, and the important national benefits conferred by the labours of various members of the association have long been duly recognized and acknowledged. Among these may be mentioned more especially the experiments on electricity and magnetism, which have achieved such important consequences in the establishment of the electric telegraph, and a more thorough knowledge of the laws which govern the weather and other meteorological phenomena. In mechanical science also, as in the experiments on the relative strength of iron, which rendered such material service to Mr. Stephenson in the erection of the Britannia Tubular Bridge, the labours of members of the British Association have been productive of the most important results. As the funds which the society collects at each meeting are more than sufficient to cover its expenses, it is enabled each year to make direct grants for the pursuit of particular scientific inquiries, which otherwise could not be conducted so efficiently, if at all; but besides this direct encouragement, its indirect influence on the promotion of science is undoubtedly great in many ways. In 1834 a grant of £20 was made for tide discussions; by 1837 the grants for various purposes had risen to £918, 14*s.* 6*d.*; and to £1595, 11*s.* in 1839; the highest amount of annual grants yet made was in 1868, £1940.

BRITISH CHANNEL. See ENGLISH CHANNEL.

BRITISH COLUMBIA, a colony of Great Britain established in 1858, and now forming with Vancouver's Island (which see) a province of the Dominion of Canada, is situated on the N.W. coast of America, between the forty-ninth and sixtieth parallels of N. lat. The boundaries are—W., the Pacific Ocean and the frontiers of the United States territory of Alaska; N., the parallel of 60°; E., the meridian of 120° W. and the Rocky Mountains; S., the United States, which are separated from Columbia by the parallel of 49° N. lat. The water boundary-line between the colony and the United States, as settled by the arbitration of the Emperor of Germany in 1872, runs through the Haro Channel, between Vancouver's Island and San Juan, leaving the latter island, the possession of which was disputed, to the United States. Thus the colony has along the seaboard a length of 500 miles, and along its mountain frontier of 650 miles. Its breadth varies from 320 to 450 miles; but of this a considerable portion perhaps will be found to be occupied by inaccessible mountain. A few peaks of the Rocky Mountains, about lat. 52°, attain altitudes of 13,000 to 16,000 feet. Area about 213,000 square miles.

One or more ranges of hill or mountain run parallel to the coast, and at a distance from it of 50 or 100 miles; but between the innermost of these ranges and the Rocky Mountains is a plateau or elevated valley, through which flows the Fraser River, the chief stream of the colony, receiving many affluents

from the W., N., and N.E., and entering the Gulf of Georgia in lat. 49° 14′. This gulf is formed by Vancouver's Island, which here extends in front of the continent; and thus the Fraser River, which is navigable for vessels of moderate size a considerable way up, has a sheltered sea at its entrance, and is not liable to those irruptions from the ocean which are so dangerous at the mouth of the Columbia and in the Bay of St. Francisco.

About 20 miles above the mouth of the Fraser is the head of the Delta, formed by two branches, of which the more southern alone is practicable for ships. At this point, where the river is broad and deep, and the country, clothed with large timber, becomes picturesque, on the right or northern bank stands New Westminster, the capital of the colony. Vessels drawing 14 feet can ascend the river to a considerable distance above New Westminster. About 100 miles higher up the river eastwards is Fort Hope, where the stream, hitherto flowing to the S., turns to the W. About 16 miles higher up, at Fort Yale, the steamboat navigation ceases, owing to the numerous falls and rapidity of the river. But a good road has been made to Lytton, a town of 1000 inhabitants, at the fork of the Fraser and Thomson rivers, and about 250 miles from the sea. Numerous lakes, generally elongated from N. to S. between the several mountain ranges, aid with short portages to facilitate communication, and the most frequented route to the Fraser above Lytton is by the river Harrison and its chain of lakes.

The climate of British Columbia is temperate and salubrious, and extremely favourable to vegetation. The summer heat is that of the S. of France; the winter resembles that of Southern Russia—the rivers are all frozen, but the sky is bright and the air calm. The forest timber attains a colossal magnitude. Fish are extremely abundant in all the streams and on the coasts. The country may be described at present as generally inaccessible, owing to the mountains, forests, and rapid rivers; but great advances have been made in the construction of roads in recent years. There are many fertile districts in the colony, among which may be mentioned in particular the delta of the Fraser River, and agriculture and stock-raising are steadily advancing. Wheat, barley, oats, and other cereals ripen readily and give a return of seldom less than 40 bushels to the acre, and the grass of the country is admirably adapted for fattening cattle. It contains valuable mineral deposits, the most important being gold and coal. The former was first found on the Fraser River in 1858, and since that time British Columbia has produced large quantities of the precious metal, though it cannot compare with California, Australia, or New Zealand. The area of the known gold-fields reaches from the forty-ninth to the fifty-third parallel of N. lat., and is from 100 to 200 miles wide. The Cariboo diggings have been among the most productive. The gold raised annually is valued at £600,000 or £700,000. Besides gold, lumber, furs, fish, and cranberries are exported.

The infant colony of British Columbia, taken in connection with that of Vancouver's Island, seems to possess every preliminary condition of great, though not perhaps instantaneous prosperity. Now that it is incorporated in the Dominion of Canada, and is about to be united with the eastern colonies by railway, its mineral and agricultural resources will no doubt be properly developed, and it will probably become one of the richest countries in the world. The pop. of British Columbia was estimated in 1869 at 50,000, including 10,496 colonists, and 1947 Chinese, the remainder being natives. British Columbia and Vancouver's Island were formerly distinct governments, but both now form one province, and were united to the Dominion of Canada in 1871.

BRITISH MUSEUM. The foundation of this invaluable institution is attributable to Sir Hans Sloane, who, in 1753, bequeathed his various collections, including 50,000 books and MSS. to the nation, on the condition of £20,000—less by £30,000 than the original cost—being paid to his heirs. This offer was agreed to by Parliament, which authorized a lottery of £100,000 to implement the bargain, as well as to purchase other collections. Montague House was appropriated for the museum, which was first opened on the 15th January, 1759. Since then the institution has been augmented by repeated government grants and donations. In 1846 £45,000 was voted for the purpose of rendering it more complete; and various sums have subsequently been added. The original edifice having become inadequate, a new building was resolved upon in 1823. This superstructure, one of the most magnificent in the metropolis, was only finished in 1847. It is from a design by Sir Robert Smirke, and forms a hollow square, facing the cardinal points of the compass. The southern, or Russell Street front, is the principal one, having an imposing columnar façade of the Ionic order. This, as well as the other three, looks into the central square court, which measures about 320 feet by 240. There are two stories of galleries and rooms round the greater part of the building; but our space is too limited to admit of a detailed account of it, or of its contents. Suffice it to say that it is commodious and elegant, and rich beyond description in the possession of rare and ancient MSS., and in Egyptian, Grecian, and Roman remains. The famous Rosetta stone, and the Hamilton and Portland vases, are amongst the collections of art. Smirke's designs were no sooner completed than it was found that additional accommodation was needed in various departments, and several new rooms were provided, but the library accommodation being wholly inadequate for the accommodation of the readers, as well as for the reception of new books, a grant was obtained from Parliament for a new building in 1854, and it was completed and opened in 1857, at a cost of £150,000. It was erected in the interior quadrangle, and contains a circular reading-room 140 feet in diameter, with a dome 106 feet in height. The whole arrangements have been completed with the utmost economy in regard to space, and besides ample accommodation for books, the reading-room now contains accommodation for 300 readers comfortably seated at separate desks, which are provided with all necessary conveniences. The plan was prepared by Mr. Panizzi, the late chief librarian, who superintended its execution. By the Act 26 Geo. II., and subsequent statutes, the British Museum is vested in forty-eight trustees, including twenty-five official, nine family, one royal, and fifteen trustees who are elected by the other thirty-five. The official trustees are composed chiefly of the great men of the state; the family trustees represent the Sloane, Cotton, Harley, Townley, Elgin, and Knight families. The royal trustee is appointed by the crown. The museum is open gratuitously on Mondays, Wednesdays, and Fridays. Admission to the reading-room is by ticket, procurable on application to the chief librarian. There are various catalogues and handbooks prepared by the officers of the museum, and containing classified descriptions of the contents of the different departments. The museum contains nine principal departments, namely, the department of printed books; the department of maps, charts, plans, and topographical drawings; the department of manuscripts; departments of natural history; the department of oriental antiquities; the department of Greek and Roman antiquities; the

department of coins and medals; the department of British and medieval antiquities and ethnography; and the department of prints and drawings.

BRITISH NORTH AMERICA. Under this name is comprehended all that part of the continent of North America which lies to the N. of the United States, with the exception of the United States territory of Alaska in the N.W., and Greenland in the N.E. The largest portion, lying N. of Canada and the United States, was formerly under the sway of the Hudson's Bay Company, but they have, in 1869, surrendered their rights to the crown, in accordance with an act of Parliament passed for that purpose in 1868, and the territory has been incorporated in the Dominion of Canada. The province of Quebec, formerly Canada East; Ontario, formerly Canada West; New Brunswick, Nova Scotia, Hudson Bay Territory, Manitoba, and British Columbia, now constitute the Dominion of Canada, the pop. of which in 1871 was 3,648,000. The separate colonies are Newfoundland, pop. 146,536, and Prince Edward's Island, 94,021.

BRITTANY, or BRETAGNE, formerly one of the largest provinces of France, being a peninsula washed by the Atlantic on all sides except the E., where it joined Poitou, Anjou, Maine, and Normandy. It now forms five departments, Finisterre, Côtes du Nord, Morbihan, Ille et Vilaine, Loire Inférieure, containing 2,995,986 inhabitants on 12,327 square miles. It is supposed to have received its name from the Britons, who were expelled from England and took refuge here in the fifth century. It formed one of the duchies of France, and was held by sovereigns nearly independent and often at war with the French monarchs till it was united to the crown by the marriage of Louis XII. with Anne of Brittany, the widow of Charles VIII., in 1499. It was given by Louis XII. to Claude, countess of Angoulême, who married Francis I., and was re-united to the crown in 1532. The province was divided into Upper and Lower Brittany. Agriculture in this territory is very backward, and it is estimated that about one-half of the surface lies waste. Corn and wine are produced in small quantities. Flax and hemp, apples and pears, are abundant and of good quality. Cider is the principal drink. Salt is made on the coast, and coals, lead, and iron are found in various parts. There are manufactures of hemp, flax, and iron, The fisheries also employ many of the inhabitants. The people of Brittany still retain their ancient language, which is closely allied to Welsh, and is exclusively used by the peasantry in the western part of the province. Many Celtic remains are found throughout the country.

BRITTON, JOHN, a celebrated writer on architectural antiquities, was born in 1771 at Kingston St. Michael, near Chippenham, Wiltshire, where his father was a general dealer and small farmer. In 1787 he came to London, and was employed for six years as cellarman in the Jerusalem Tavern, Clerkenwell, and afterwards served in the same capacity in the London Tavern. He next entered the employment of a hop merchant in Southwark, and then an attorney's office in Gray's Inn. During all this period he had sedulously cultivated his taste for reading during his leisure hours, and took part in the proceedings of several debating societies. In 1799 he accepted an engagement from a Mr. Chapman to write, sing, and recite for him at a theatre in Panton Street, Haymarket, at a salary of three guineas per week. From this period his literary career may be said to have commenced, developing itself at first in the form of pamphlets, song-books, and similar minor subjects. He soon advanced, however, to a higher grade, and in 1801 appeared the Beauties of Wiltshire, in two volumes, by J. Britton and E. W. Brayley. These collaborateurs, with others, subsequently completed a similar work for all the other counties of England (London, 1801–16, eighteen vols.; 1825, twenty-six vols., &c.) In 1805 Mr. Britton published his Architectural Antiquities of England in five 4to volumes, which was followed by his Cathedral Antiquities, in fourteen volumes, commenced in 1814 and completed in 1835, and the Dictionary of the Architecture and Archæology of the Middle Ages, 1832–38. He reached the advanced age of eighty-six with his faculties almost unimpaired, and died in London on 1st January, 1857.

BRIVES, or BRIVE LA GAILLARDE (ancient *Briva Curetia*), a town in France, department of Corrèze, agreeably situated amidst vineyards and orchards, on left bank of Corrèze, surrounded by a fine avenue of elms, houses substantially built of stone, but the streets narrow, and the public squares indifferent. It has a college and hospital, a court of first resort and of commerce, an agricultural society and seminary. Manufactures—woollens, cotton goods, nut oil and wax-candles, brandy, wax-refining, tiles for drainage, and pottery. Trade—timber, wine, chestnuts, truffles, truffled poultry, wool, cattle, pigs, &c. Coal is worked extensively in the neighbourhood. Pop. 10,389.

BRIXHAM, a market town and seaport, England, county of Devon, is prettily situated on the English Channel, occupying the sides of two hills, a little S. from Berry Head, the S. point of Torbay, and 23 miles S. of Exeter. The generality of the older houses are very indifferent buildings, but some of those of more recent erection are sufficiently respectable. The parish church is a large ancient structure, in the perpendicular style. The trade of Brixham is chiefly in fish, and is of considerable extent, London, Bath, and Bristol receiving supplies from this place. The port possesses also a number of vessels engaged in the coasting and foreign trade; those in the latter plying chiefly to the Mediterranean. Brixham is celebrated in history as the place where the Prince of Orange, afterwards William III., landed, Nov. 4, 1688. Pop. (1871), 4941.

BROACH, or BAROACH, a ruinous town in Guzerat, Hindustan, on the Nerbuddah. It contains a Hindu hospital for sick and infirm beasts, birds, and insects, which has considerable endowments in land, and accommodates not only animals considered sacred by the Hindus, such as monkeys, peacocks, &c., but horses, dogs, and cats: it has also, in little boxes, an assortment of lice and fleas. These animals are fed only on vegetable food, and are generally in a miserable condition. Near Broach is the celebrated banian-tree, which has been renowned ever since the first arrival of the Portuguese in India, and which, according to the natives, was capable of sheltering 10,000 horsemen under its shade. Part of it has been washed away by the river, but enough yet remains to make it one of the noblest groves in the world. The town was taken by storm by the British in 1772, and with the district, ceded to them by treaty with Scindiah in 1803. It carries on a considerable trade in raw cotton, grain, and seeds, with Bombay and Surat. Pop. 33,000.

BROACH-TO, to incline suddenly to windward of the ship's course when she sails with a large wind; or, when she sails directly before the wind, to deviate from her line of course with such rapidity as to bring her side to windward, and expose her to the danger of oversetting. The masts act like levers on the ship, sideways, so as to overturn her, unless she is relieved by the rending of the sails, or the carrying away of the masts.

BROAD ARROW is a government mark placed on naval stores to distinguish them as public or crown

property. The origin of the mark, as well as of its present use, is doubtful. It is supposed to have been originally a Celtic character. The use of the broad arrow by private persons is prohibited under a penalty.

BROAD PIECE, a denomination that has been given to some English gold pieces broader than a guinea, particularly Caroluses and Jacobuses.

BROADSIDE, in a naval engagement, the whole discharge of the artillery on one side of a ship of war, above and below. The fighting power of a ship was formerly estimated by the weight of her broadside. A squall of wind is said to throw a ship on her broadside, when it presses her down in the water so as nearly to overset her.

BROADSWORD, a sword with a broad blade, designed chiefly for cutting, formerly used by some regiments of cavalry and Highland infantry in the British service. The claymore or broadsword was formerly the national weapon of the Highlanders.

BROCADE, a stuff of gold, silver, or silk, raised and enriched with flowers, foliage, and other ornaments. Formerly it signified only a stuff woven all of gold or silver, or in which silk was mixed; at present all stuffs, grograms, satins, taffetas, and lutestrings are so called, if they are worked with flowers or other figures.

BROCARIO, ARNALDO GULIELMO, a celebrated Spanish printer in the beginning of the sixteenth century. The most celebrated work which proceeded from his press in the University of Alcala de Henares, a town better known by its Latin name of *Complutum*, was the Polyglot of Cardinal Ximenes, which was printed in 1514–16, in six vols. folio, and has served as a model to all the Polyglots which have since appeared. The first four vols. contain the Old Testament in Hebrew, Chaldee, Greek, and Latin; and the fifth, the New Testament in Greek and Latin. The work has become extremely rare, and a copy of it in vellum has been sold for £250 sterling.

BROCKEN. See HARTZ.

BROCOLI, a late variety of the cauliflower (*Brassica oleracea botrytis*), hardier and with more colour in the flower and leaves. The chief varieties are green, purple, and dwarf brocoli. Brocoli is inferior in flavour to cauliflower, but serves as a substitute for it when the latter cannot be obtained.

BRODIE, SIR BENJAMIN COLLINS, BART., D.C.L., F.R.S., an eminent surgeon, born 9th June, 1783; died 21st October, 1862. He was a younger son of the Rev. P. B. Brodie, rector of Winterslow, near Salisbury, where he was born. His grandfather, Brodie of Brodie, had left Scotland on account of his Jacobite principles. His father superintended his education till he was eighteen, when he was sent to the Hunterian School of Anatomy in Great Windmill Street. In 1803 he became a pupil of Sir Everard Home, at St. George's Hospital. He passed his examinations and became a member of the college in 1805, at which time he was appointed assistant to Mr. Wilson, the demonstrator of anatomy. In 1809 he became a lecturer of the school and assistant surgeon of the hospital. In 1810 he was elected Croonian lecturer to the Royal Society, and chose for his subject, The Influence of the Brain on the Action of the Heart and the Generation of Heat. During the same year he laid before the society various papers, among which was one On the Effects of certain Vegetable Poisons, the excellence of which caused him to be elected a fellow, and in the following year he received the Copley medal. His reputation as a distinguished surgeon was now established, and his professional career became one of uniform success. From 1819 to 1823 he was professor of anatomy at the Royal College of Surgeons. In 1822 he was elected a full surgeon at St. George's. He continued giving clinical lectures there till 1830, when the increasing demands of his profession compelled him to discontinue them. In 1832 he succeeded Sir Everard Home as sergeant-surgeon to William IV., and was made a baronet by patent in 1834. Her Majesty Queen Victoria continued him in the same appointment. From 1835 to 1846 he was a member of the Court of Examiners of the College of Surgeons, and in 1844 he was president of the court. In 1858 he was elected president of the Royal Society, which honour he held till 1861. For some years before his death his sight had been failing, and for about two years he was almost totally blind. As a professional practitioner his gains exceeded those of almost any man of like profession in his time. His earlier essays gained him a high reputation as an accurate observer and sound physiologist. In 1851 he republished a selection of them, entitled Physiological Researches. As a surgeon he had few equals, and his work on Pathological and Surgical Observations on Diseases of the Joints, 1818, is esteemed of great value both in Great Britain and on the Continent. It has gone through many editions, successively enriched by the additional experience of the author. In 1854 he published a work in a colloquial form entitled Psychological Inquiries. The dialogue is not controversial, and the work contains the mature opinions of the author on speculative subjects which had occasionally occupied him in his earlier works, and which had evidently been long revolved in his mind. His philosophy is opposed to materialism. He maintains the distinction between mind and matter, and insists on the evidences of design in nature as proof of the superintendence of a creative mind, and of the similarity of human intellect to that of the Deity. He was married and left two sons.

BRODY, a town in Austrian Galicia, situated in the circle of Zloczow, near the Russian frontier, 58 miles E.N.E. of Lemberg, on a swampy plain. It has 18,743 inhabitants, about two-thirds of whom are Jews, who have a college and a school for the instruction of artists and mechanics. The commerce, carried on principally by Jews, is important, the town being very favourably situated for the exchange of the products of Poland for the horses, black cattle, wax, honey, tallow, skins, furs, anise, preserved fruits, &c., of Walachia, Turkey, the South of Russia, &c.

BRODZINSKI, KAZIMIERZ, one of the most distinguished of modern Polish poets, born at Krowlowsko in 1791, died 1835. He joined the ranks of the Polish patriots in 1809 at Cracow, and served as an inferior officer in a regiment of artillery. At this time he made his first appearance as an author by publishing poems entitled Pienia Wiejskie, in which the manners of the peasantry are described, and their language expressed, with great success. After residing some time at Warsaw and Modlin he accompanied the French in their invasion of Russia, and shared in their disastrous retreat. At the battle of Leipzig he was taken prisoner; but having been liberated on his parole went first to Cracow, and then to Warsaw, where he obtained the chair of esthetics in the university. While here he published various poems and numerous critical articles in reviews and other periodicals, and gained a name, particularly in the new romantic school, as one of its ablest supporters. After the suppression of the University of Warsaw in 1831 he lived for some time without employment, and under surveillance, at Warsaw. Being seized with an affection of the chest he with difficulty obtained permission to try the effects of the waters of Bohemia, where he died. His collected works, which form a number of volumes, were published at Wilna in 1842.

BROEKHUIZEN, JOHAN VAN (better known as *Janus Broukhusius*), was born at Amsterdam in 1649; died 1707. When young he lost his father, a hatter, and was put under the guardianship of one of his relations, who placed him with an apothecary, though he desired to study a learned profession. While in this situation he wrote verses, and was encouraged by the applause of the public. He subsequently entered the military service of his native country. In 1674 he embarked under the command of the famous admiral De Ruyter, as a marine, on an expedition to the West India Islands. In the autumn of the same year he went into winter quarters at Utrecht. Here he became acquainted with several scientific men, and published a collection of his poems (Utrecht, 1684). A splendid edition of them appeared at Amsterdam in 1711, 4to. He afterwards received a military appointment at Amsterdam, which afforded him leisure for literary pursuits. He published an edition of the poems of Sannazarius, and also of Palearius's works, an edition of Propertius (Amsterdam, 1702 and 1726, 4to), and Tibullus (Amsterdam, 1708 and 1727, 4to), with critical notes. In these works he displayed extensive knowledge. After the Peace of Ryswick he received his dismission, with the rank of a captain.

BROGLIE, a family distinguished in the annals of French wars and diplomacy, which derives its origin from Piedmont.—1. FRANÇOIS MARIE, DUC DE, marshal of France, born in 1671; died in 1745; from 1689 fought with distinction in the Netherlands, in Germany, and Italy. He was also employed in diplomatic affairs, and concluded a treaty between France, England, and Prussia in 1725. He rose by degrees, till, in 1734, he became marshal of France. In the Austrian War of Succession he had the chief command of the armies in Bavaria and Bohemia; but having to retire to the frontiers of France he fell into disgrace at court, and was relegated to his estates, where he died.——2. VICTOR FRANÇOIS, DUC DE, eldest son of preceding, likewise marshal of France, born in 1718; died 1804; commenced his career under his father in the battles of Guastalla and Parma (1734), was engaged in all the wars of France, and was created marshal in 1759. Jomini considered him as the only French general who had shown constant ability during the Seven Years' war. He was engaged in the battles of Hastenbeck, Rossbach, Sondershausen, and Lützelberg, and being appointed to the chief command, defeated the Prussians and Hessians at Bergen in 1759, for which Francis I. of Austria created him a prince of the empire. In 1760 he gained another victory at Corbach, but was defeated, together with the Prince of Soubise, at Willingshausen, in the following year. In consequence of this and the favour of Soubise at court he was exiled. He was recalled in 1764, and in 1789, when the revolution broke out, Louis XVI. appointed him minister of war; at the same time he received the command of the troops that were to keep Paris in check. The desertion of the National Guards rendered all his efforts vain, and Broglie left France. In the campaign of 1792 he commanded a division of the *émigrés* without success. After its close he withdrew entirely from public life, and died at Münster in the eighty-sixth year of his age.——3. CLAUDE VICTOR, Prince de Broglie, born in 1757, guillotined 27th June, 1794, was the third son of Victor François. He entered at first into the views of the revolutionary party. He was deputy of the nobility of Colmar to the states-general in 1789. After the dissolution of the constituent assembly he was appointed field-marshal in the army of the Rhine, but upon his refusal to acknowledge the decree of the 10th of August suspending the royal authority was deprived of his command, and afterwards summoned before the revolutionary tribunal, and led to the guillotine. ——4. CHARLES FRANÇOIS, COMTE DE, a brother of Victor François, born 1719; died 1781; is known in the history of French diplomacy as the head of the secret ministry of Louis XV. Although Broglie discharged the duties of this difficult office with much ability, yet, as his views were often in direct opposition to those of the ministry, the greatest confusion was often produced. He was therefore formally banished by the king; but at the same time received secret instructions to continue his usual duties in his exile. He served for some time in the campaigns in Germany, and distinguished himself by the defence of Cassel in 1761.

BROGNI, JEAN ALLARMET, CARDINAL DE, born in 1342, was the son of a peasant of the village of Brogni, near Annecy in Savoy. He was educated under ecclesiastical patronage partly at Geneva, partly at Avignon, and acquired a great reputation for his knowledge of the canon law. Pope Clement VII., who had fixed his see at Avignon, intrusted him with the education of his nephew, and was so pleased with his progress that he made Brogni a cardinal, giving him at the same time the see of Viviers, and shortly after the archbishopric of Arles. Benedict XIII., who succeeded Clement as pope of Avignon, conferred on Brogni the see of Ostia and Veletri, and made him vice-chancellor of the Roman Church. Alexander V., then the Italian pope, confirmed him in his see of Ostia, and made him chancellor of the Church. In 1414 he repaired to Constance to prepare for the council which was about to be held. When it was held he presided in it from its sixth to its forty-first sitting, between 1415 and 1417, and was in constant communication with the Emperor Sigismund, the princes, and prelates. While thus presiding he pronounced sentence of deposition on John XXIII., who had convened the council, and on Benedict XIII., who was convicted of perjury, schism, and heresy, and he received the resignation of Gregory XII. He also pronounced the sentence that consigned John Huss to the stake. He is said to have visited Huss in prison more than once, spoken kindly to him, and used both argument and persuasion to induce him to recant. Brogni was never ashamed of his humble origin, but seems always to have kept it before his own mind, and even taken means to keep it before the minds of others. He willingly accepted in 1422 the see of Geneva in lieu of that of Arles, because, though the former was far inferior in value, it promised to bring him back to his native district, and make him again familiar with the haunts and humble scenes of his youth. His hope, however, was disappointed; and before he could set out to take possession of his new see he was seized with illness, and died at Rome, at the age of eighty-four years. He founded the hospital of Annecy, and the College of St. Nicholas at Avignon.

BROKE, SIR PHILIP BOWES VERE, a British admiral, was born in 1776; died in 1841. He entered the navy in 1792, and after he had seen much active service, distinguished himself, particularly in 1813, as commander of the *Shannon*, in the memorable battle which that vessel, in answer to a regular challenge, fought with the *Chesapeake* off the American coast. The *Shannon*, carrying thirty-eight guns and 330 men, after an engagement of only fifteen minutes, boarded and captured the *Chesapeake*, carrying forty-nine guns and 440 men. Sir Philip was severely wounded in the action.

BROKER, an agent who is employed to conclude bargains or transact business for others in consideration of a charge or compensation, which is usually in proportion to the extent or value of the transaction

completed by him, and is called brokerage. The broker in English law is considered a middleman, or intermediate negotiator between the principals on both sides of the negotiations conducted by him. Primarily he is the agent of one party, who originally employs him, but as it is his business to receive and represent to his principal, if need be, the proposals of the other party, he comes under a twofold obligation, and good faith is required in his dealings with both, or, if there should be a plurality of negotiators, with all. The use of brokers indicates a considerable advance in mercantile organization, and implies extensive and complicated mercantile relations in the community where it prevails. In the natural order of development it would probably come after the establishment of a regular currency. In a community where the merchants or negotiators were few there would be little need for a broker, and his fees would hardly suffice for his subsistence; but a broker who was only occasionally employed would very imperfectly represent the principle of brokerage, which requires that the agent should be exclusively set apart for agency business. In large mercantile communities not only are brokers regularly employed, but the business of a broker is limited to a particular class of transactions, with which he is expected to be specially conversant; and brokerage forms not a single trade, but a complete class of trades with a systematic subdivision. The use of a broker in mercantile transactions rests upon two main positions. A merchant may deal in a number of different commodities, with all of which and with the parties who buy or sell them he cannot be so specifically acquainted as to be able to conduct his whole business satisfactorily with principals; but in each transaction he can find a broker whose business it is to have the exact knowledge required for his purpose, and whose knowledge and practical experience he may have the use of for a fee. But even when the principal knows exactly with whom he is going to deal, and has sufficient experience to deal for himself, there are often advantages in carrying on negotiations through a third party. Experience shows that there are many different kinds of influence and pressure brought to bear in the conduct of mercantile transactions, and there is almost always some kind or other of such extraneous influences which a man who is acting for himself finds it difficult to resist. A merchant, for example, may be doubtful of the credit of a proposed customer, and yet be very unwilling to tell him so. In all such cases a broker who can refer all difficulties and refusals to an unknown principal has an advantage which is well worth purchasing by a moderate fee. In markets where the business of brokerage is well understood the services of a broker are regularly resorted to for this reason alone, even when they might be otherwise dispensed with, and the broker consequently obtains a standing, and acquires immunities, which enable him to conduct his business with a freedom and success which would otherwise be impossible. This is well illustrated by the different treatment which the broker receives in a small or imperfectly educated mercantile community. If a broker in such a community is employed for his specific knowledge, say of a particular class of buyers, he takes great pains to conceal this knowledge from his employer, who would otherwise on the next occasion go straight to the principals. In a large market the broker attempts no such concealment, and he is protected not only by the intrinsic value of his services, but by the habits of the market, which would attach open disgrace to the attempt to use the information of a middleman to his disadvantage. Brokers have legal privileges, covering the right of remuneration for their services, but these are founded on and derive their efficacy from the mercantile usages of each community. In a mercantile community there are nearly as many species of brokers as there are different departments of trade, but there are a few which from their particular privileges or importance it may be of advantage to enumerate.

BILL-BROKERS, EXCHANGE-BROKERS. See BILL OF EXCHANGE.

INSURANCE-BROKER is the middleman who negotiates between underwriters and the owners of vessels and shippers of goods whose property he insures. (See UNDERWRITER.) An insurance-broker has a set of underwriters, who are his principals, and a constituency of owners and merchants, who are his customers, and who send him orders to insure for them. He meets with other brokers to settle the terms on which risks will be taken, and when he has a risk to cover for one of his customers he may perhaps put down his own underwriters for a portion of it, and give a portion of it to other brokers to be covered by their underwriters. In this way the risks are divided, and each underwriter has a large number of small risks instead of a few great ones. The transactions of the broker are subject to the approval of the underwriters, who must sign the contract as principals; but he usually receives general instructions to act for them in a particular way, and as long as he conforms to his instructions they sign as a matter of course. This understanding enables him to carry on his business systematically with his customers. He is paid by a percentage of the premiums. When a merchant insures goods through a broker the premium or price of the insurance may not be immediately paid; but if there is an established period of credit the insurance, notwithstanding this, is valid, and the policy, or stamped engagement signed by the underwriters, lies with the broker in trust for the insurer as a lien for payment of the premium. If the broker gives any credit to the insurer beyond the established custom he is himself liable to his principal for the payment of the premium, and it becomes a point of great legal nicety whether the policy is vitiated or not. The business of an insurance-broker is quite different from that either of an authorized agent, or of a sub-agent or canvasser of an insurance company. Marine insurance is now largely carried on by companies, and the merchant who deals with the agent of a company deals to all intents not with a broker but with a principal.

PAWNBROKER, though called a broker, is really a principal. See PAWNBROKER.

PRODUCE-BROKERS and others who sell by auction act by license, and are sometimes sworn.

SHIP-BROKER is the agent of owners of vessels in chartering them to merchants or procuring freights for them from one port to another. Like the insurance-broker he usually acts upon general instructions, but his business is governed entirely by the common principles of brokerage.

STOCK-BROKER is the agent of dealers in shares of joint-stock companies, government securities, and other monetary investments. On account of the great responsibilities incurred by these brokers they are usually placed under some restrictions or special regulations, either by legal enactment or mercantile custom. In France the stock-brokers (*agents de change*) are sworn in. They are allowed from one-eighth to one-fourth per cent. brokerage on each transaction. The number is limited for each town according to its size. The number for Paris is sixty, each of whom gives security for 125,000 francs (£5000). The position of a stock-broker in Paris or other large towns of France has thus become a property transmissible by purchase, and can only be acquired by a large capitalist. In America the trade

of stock-broker is unrestricted. In England stock-brokers are subject to certain general legal restrictions, as that by which contracts in the form of wagers are rendered void, and the sale of stock in the public funds is limited to licensed brokers, but in general the trade is only restricted by the regulations of the brokers' associations in each town, which are more or less modelled upon the rules of the London Stock-exchange, with which all other associations of brokers have necessarily, though indirectly, the most intimate business connections. The London Stock-exchange is a voluntary and partly a proprietary association. It is governed by a committee elected by the members, to whom all disputes are referred. It recognizes no dealings but those among its own members, and no member is permitted to take legal proceedings against another without his own consent. The committee fixes the modes of doing business and the time and conditions of settlements. An applicant for admission must obtain the security of three members for a period of two years to the extent of £500 each. No applicant is admitted who is engaged in other business; the wives of members are also prohibited from engaging in business. Partnerships with non-members, or between brokers and dealers, are prohibited; and all partnerships among members must be intimated to the committee and posted in the exchange. Members of the stock-exchange are not prohibited, as such, from dealing on their own account, and authorized clerks approved of by the committee are allowed to do business for their principals. A member declared to be a defaulter ceases to be a member of the stock-exchange. Defaulters are re-admitted under regulations specially adapted for the purpose. The re-admission of defaulters is a special function of the committee, and has precedence of all other business.

BROMBERG, a town of Prussia, in the province of Posen, and 69 miles N.E. of the city of that name, capital of the government and circle of Bromberg, is situated on the Brahe, 6 miles W. of its confluence with the Vistula. It is well built, has three suburbs, and contains a monastery, a convent, and several educational and charitable establishments. It has a large sugar-refinery, several tobacco and chicory manufactories, several flour and oil mills, potteries, and limekilns; also a vinegar-work, several distilleries, and breweries. It has likewise a considerable trade in grain and wine, for which its situation on the Bromberg Canal gives it great advantages. For a short time under Napoleon, Bromberg was restored to the Poles, and formed the capital of a department of the same name. Pop. in 1871, 27,734.

BROMELIACEÆ, a natural order of endogenous plants inhabiting the tropical regions. They are monocotyledonous. The type of the order is the genus Bromelia. The flowers are hermaphrodite, generally regular, disposed in clusters sometimes very dense, more rarely on branched racemes. The leaves are alternate, elongated, narrow, toothed and spinous on the margins. The calyx is formed of six sepals, the three exterior ones shorter and less coloured, the interior ones longer and petaloid in form. The stamens are usually six, but sometimes fewer, inserted in the internal face of the sepals, sometimes quite at their base. The style is simple, sometimes divided into three segments at its summit, and terminated by three stigmata. The fruit is capsular or succulent, and many-seeded. They grow in the rich vegetable soil of forests, or upon the branches of trees, round which they twist their roots, without being parasitical; they are consequently called air-plants. They frequently grow for months suspended in the air, after being severed from their roots. Their flowers are white, crimson, blue, or purple, and are very handsome. The fruit of the genus Ananassa is the well-known pine-apple. The leaves are hard, and are so contrived as to be able to hold water at the base. They are natives of the Antilles and other tropical regions of America, but are naturalized in Asia and Africa. Their fibres are valuable for a variety of purposes.

BROMINE (Greek *brōmos*, a bad smell), an element discovered by Balard in 1826, and so named in consequence of its disagreeable odour. It is obtained from the bittern of sea-water, the washings of the ashes of sea-weed, and from the salt mines of Stassfurt. It is very widely distributed, but is not abundant. It is a dark-red liquid, which gives off a red vapour at the ordinary temperature of the air; the specific gravity of the liquid is 2·97, and of the vapour (compared with air) 5·5. The liquid solidifies at 19°, and boils at 145° Fahr. It dissolves abundantly in ether, less readily in alcohol, and less still in water. The aqueous solution has a reddish-yellow colour, and the strong suffocating odour of bromine, and it bleaches, though not so readily as chlorine water. Bromine is absorbed by alkalies, forming a bromide and bromate. It combines with oxygen and hydrogen to form hypobromous, bromic, perbromic, and hydrobromic acids. Analogous to the corresponding compounds of chlorine, ordinary combustibles do not burn in bromine vapour, but some of the metals, when finely divided, catch fire in it, and phosphorus combines with it with great violence. Bromine acts as a caustic and local irritant. Small doses act very powerfully on the alimentary canal. It seems to resemble iodine in its therapeutic properties. Bromide of potassium is also used in medicine, and the bromides of cadmium, silver, and ammonium are employed in photography.

BROMLEY, a town of England, county Kent, 10 miles S.S.E. of London, on the London, Chatham, and Dover Railway, with an alms-house for old people, and a well-endowed hospital for forty widows of clergymen. It has a market square with a large town-hall, many good houses, and has rapidly increased by the growth of large groups of houses occupied by London merchants in its vicinity. Pop. in 1871, 10,674.

BROMLEY, WILLIAM, an eminent engraver, born at Carisbrooke, in the Isle of Wight, in 1769; died 1842. He came to London, where his talents soon brought him into notice, and he enjoyed the esteem of several of the most distinguished painters and sculptors of the metropolis. Among his early productions was a series of prints to Macklin's Bible, and among those of a later period are the engravings of two portraits of the Duke of Wellington by Sir Thomas Lawrence. He was ultimately under almost constant employment at the British Museum, engraving the drawings of H. Corbould. His son John Bromley, who died three years before him, also acquired great eminence as an engraver.

BROMSGROVE, a market town of England, in the county of Worcester. It is pleasantly situated on a plain, 13 miles S.W. of Birmingham, on the left bank of the Salwarp, and consists of one principal street, and some diverging lanes. The houses are in general well built, and mostly of brick, intermingled with a few ancient wood-framed edifices, ornamented with black and white stripes. In the centre of the town is the town-hall, a neat and commodious, though unpretending building. The parish church, on an eminence in the centre of the town, is an ancient and handsome structure, in the decorated English style, with a tower 189 feet high. Buttons, nails, hooks, and railway waggons are manufactured here to a considerable extent. Malting is also carried on. Pop. in 1871, 6967.

BRONCHITIS, an inflammation of the mucous membrane of the bronchial tubes, or the air-passages leading from the trachea to the lungs. It is of common occurrence in this country, and may be either acute or chronic. Its symptoms are those of a feverish cold, such as headache, lassitude, and an occasional cough, which are succeeded by a more frequent cough, occurring in paroxysms, and a feeling of great oppression on the chest. Slight attacks of acute bronchitis are frequent and not very dangerous. They may be treated with counter-irritants, such as mustard poultices or fomentations of hot turpentine. Medicines to promote perspiration and expectoration are also given. In the severer form, acute bronchitis is a formidable malady, and requires prompt treatment. Confirmed chronic bronchitis is hardly amenable to medical treatment, and requires care and general good management.

BRONGNIART, ALEXANDRE, a celebrated chemist and mineralogist, was born at Paris in 1770; died at Paris in 1847. He turned his attention at a very early age to the study of the ceramic art; and after having served for some time in the army on the medical staff, was appointed, in 1801, director of the porcelain manufactory at Sèvres, where he revived the art of painting on glass. In 1807 appeared his Traité Elémentaire de Minéralogie; and about the same time his labours in the department of natural history brought him into contact with Cuvier, whom he aided materially in classifying the newly-discovered fossils of Montmartre. Along with Cuvier he engaged in the composition of the Essai sur la Géographie Minéralogique des Environs de Paris, which was first published in 1810, and afterwards appeared in 1822, much enlarged, under the title of Description Géologique des Environs de Paris. Brongniart made extensive geological tours throughout Europe, from Scandinavia to Greece. In 1845 appeared his Traité des Arts Céramiques. He was a member of the Academy of Sciences in 1815, and succeeded Haüy as professor of mineralogy in the Museum of Natural History in 1822.

BRONKHORST.—1. PIETER VAN, a Dutch painter, was born at Delft in 1588, and died in 1661. He painted, with great success, perspective views of temples and churches, enlivened with small but well-executed human figures. In the town-house of Delft is his representation of Solomon's judgment.—— 2. JAN VAN, born at Leyden in 1648; died in 1726; learned the art of painting without any instruction, and attained to a high degree of perfection. He principally painted animals, and was particularly successful in his birds. The lightness and brilliancy of the feathers are represented with much truth. He gained his living as a pastry-cook, and devoted himself to painting to gratify his love of art.——3. Another JAN VAN, born at Utrecht in 1603; died 1680; was a painter on glass. His works in the new church at Amsterdam are much esteemed. He has also engraved some works of Cornelius Poelenburg.

BRONTE, a town of Sicily, Val di Catania, 22 miles N.N.W. of Catania, in a picturesque situation at the W. base of Mount Etna. It has several churches, convents, and a seminary; manufactures of woollen cloth and paper, and some trade in wine, oil, silk, grain, almonds, &c., produced in the neighbouring district. Lord Nelson was created Duke of Bronte by the Neapolitan government in 1799. Pop. 11,760.

BRONTÉ, CHARLOTTE (afterwards MRS. NICHOLLS), the eldest of the three sisters so well known by the *noms de plume* of Currer, Ellis, and Acton Bell, was born at Thornton, in Yorkshire, 21st April, 1816; died at Haworth, 31st March, 1855. She was the third daughter of the Rev. Patrick Brontë, who at the time of her birth was rector of Thornton, from which he removed in 1820, on becoming incumbent of Haworth, a moorland village in the West Riding of Yorkshire, about 4 miles from Keighley. Her mother died soon after this removal, and her father, an able though eccentric man, brought up Charlotte and her sisters in quite a Spartan fashion, inuring them to every kind of industry and fatigue. This object, however, was not judiciously carried out; the children were insufficiently nourished, were debarred from companionship and the usual amusements of childhood; and though to this training may no doubt in great part be ascribed the development of the peculiar genius which they afterwards displayed, there can be no doubt of its having contributed to foster the seeds of pulmonary disease, which afterwards cut them off at an untimely age. After an education received partly at home, and partly at the schools of Cowan's Bridge and Roe Head, Miss Brontë entered the latter for a time as a teacher, but soon found herself compelled by ill health to abandon the occupation. She then filled successively two situations as governess in a family, and in 1842 went with her sister Emily to Brussels, with the view of acquiring a knowledge of the French and German languages, and thereby qualifying themselves better to act as teachers. From Charlotte's life there much of the description in her novel of Villette is derived. In 1844 arrangements were entered into by her, in company with her sisters, to open a school at Haworth, but from the want of success in obtaining pupils no progress was ever made with their scheme. The two eldest daughters having died many years before, and an only brother having also gone, Charlotte, with her sisters Emily and Anne, were the only members of the family still remaining to their father. They resolved now to turn their attention to literary composition, for which their early studies well qualified them; and in 1846 a volume of poems by the three sisters was published, under the names of Currer, Ellis, and Acton Bell. It was issued at their own risk, and attracted little attention, so they quitted poetry for prose fiction, and produced each a novel. Charlotte (Currer Bell) entitled her production The Professor, but it was everywhere refused by the publishing trade, and was not given to the world till after her death. Emily (Ellis Bell) with her tale of Wuthering Heights, and Anne (Acton Bell) with Agnes Grey, were more successful, but neither of these works possess much merit. Charlotte's failure, however, did not discourage her, and she composed the extraordinary novel of Jane Eyre, which found a purchaser in the firm of Messrs. Smith & Elder, and appeared in October, 1847. Its success was immediate and decided; and being published anonymously, numerous speculations were excited as to its authorship, many maintaining that the reflections expressed, and the general delineation of the characters in the story, were of too masculine an order to be the production of a woman, while at the same time it was perfectly evident that none but a woman could have executed some of the touches. Her second novel of Shirley appeared in 1849, but though both possessing considerable merit and tolerably successful, it falls far below Jane Eyre. Previous to this she had lost her two sisters, Emily dying on 19th Dec. 1848, and Anne on 28th May, 1849. She now visited London, and shone for a time as one of its literary celebrities. In the autumn of 1852 appeared Villette, the scene of which is almost entirely laid in a school at Brussels, but it possesses nevertheless an immense interest, which never flags from the beginning to the end of the book. A painfully morbid tendency indeed, the result of an unhealthy physical organization, is conspicuous in this, as in the other writings of Charlotte Brontë. Shortly after its pu-

lication an offer of marriage was made to her by her father's curate, the Rev. Arthur Bell Nicholls, who had loved her long and silently, but owing to her father's objections their union was for a time impeded. Mr. Brontë ultimately changed his mind and gave his consent, and his daughter was married to Mr. Nicholls in June, 1854. Consumption, however, had already marked her, like her sisters, for a victim, and nine months after her marriage she expired at Haworth, in the churchyard of which she lies buried. Her originally rejected tale of The Professor was published after her death, in 1857, and the same year a biography of her appeared from the pen of Mrs. Gaskell.

BRONZE is an alloy of copper and tin. English writers frequently confound this with brass, which is an alloy of copper and zinc, as in speaking of 'brass cannon,' while the metal of which cannon are made is bronze, which is much harder than either brass or copper, and which was also the metal commonly used by the ancients for making both offensive and defensive arms before the mode of working iron was generally understood. The use of the term brass for bronze was probably introduced by our poets, who frequently speak of the brazen armour of the Greeks. Bronze was used by the Assyrians and Egyptians. Layard brought many ornaments and other articles of bronze from Assyria. Bronze is more fusible, as well as harder than copper. It is also a fine-grained metal, taking a smooth and polished surface; hence its universal use, both in ancient and modern times, in making casts of all kinds, medals, bass-reliefs, statues, &c. Its colour is a reddish-yellow, and is darkened by exposure to the atmosphere. Bronze is used in modern manufactures for a variety of purposes. Toothed wheels, optical and mathematical instruments, bells, nails for delicate machinery, and many other articles are formed of it. Its composition varies according to the purpose for which it is to be employed, and other constituents besides copper and tin frequently enter into it. Whatever alloy is principally formed of these metals, however, is called bronze. It has been found, on examination, that the bronze weapons of the Greeks and Romans were of the best composition for securing the greatest density in the alloy, and the cutting edges were brought to the highest point of tenacity by hammering. Gun-metal consists of about 90 parts of copper to 9 or 10 of tin. Old cannon are frequently used for casting statues, for which the proportions are similar. Bell-metal consists of 78 of copper and 22 of tin. For edge-tools—copper, 100 parts; tin, 14. For medals—copper, 89; tin, 8; zinc, 3, are used. For ornamental articles, zinc and lead are frequently added. These four metals are usually contained in the bronzes of France. There is some difficulty in making bronze, from the liability to the loss of tin, zinc, &c., by oxidization. A greenish colour is imparted to ancient bronzes by oxidization, which is imitated in modern bronzes by chemical appliances (see BRONZING). Bronze is used in the coinage of Great Britain and France.

BRONZES, in archæology, works of art cast in bronze. The ancients used bronze for a great variety of purposes: arms and other instruments, medals, and statues of this metal are to be found in all cabinets of antiquities. Egyptian idols of bronze are contained in the British Museum. The most celebrated antique bronze statues are, the sleeping satyr; the two youthful athletes; the colossal equestrian statue of Marcus Aurelius, at Rome; the Hercules of the capitol; the colossal head of Commodus; the statue of Septimius Severus in the Barberini Palace. The horses of St. Mark, at Venice, are almost copper. On tables of bronze were inscribed laws, edicts, and treaties. 3000 of these were destroyed by fire in the time of Vespasian. Bass-reliefs, vaults, and doors of public edifices were ornamented with decorations of the same metal. Urban VIII. took from the Pantheon alone 450,000 pounds of bronze, which he used for the ornaments of St. Peter's, and for the cannon of the castle of St. Angelo. One of these was composed wholly of bronze nails taken from the portico, and bore the inscription, *Ex clavis trabalibus porticus Agrippæ*. The ancients considered this metal as naturally pure; all their instruments of sacrifice and sacred vessels were therefore of bronze. They also believed it endowed with the power of driving away spectres and malignant spirits (Ov. Met. vii. 226, and Fast. v. 441). The words *moneta sacra* are found only on bronze medals. It was sacred to the gods; and the Roman emperors who struck gold and silver coins could not strike them of bronze without the permission of the senate; hence the inscription S. C. (*Senatus consulto*). (For the method of casting in bronze among the ancients, see Winckelmann's History of Art, book ii.) The moderns have also made much use of bronze, particularly for statues exposed to accidents or the influence of the atmosphere, and for casts of celebrated antiques. The moulds are made on the pattern, of plaster and brick-dust. The parts are then covered on the inside with a coating of clay as thick as the bronze is intended to be. The mould is now closed, and filled on its inside with a nucleus or core of plaster and brick-dust, mixed with water. When this is done the mould is opened, and the clay carefully removed. The mould, with its core, are then thoroughly dried, and the core secured in its position by bars of bronze, which pass into it through the external part of the mould. The whole is then bound with iron hoops, and the melted bronze is poured in through an aperture left for the purpose: of course the bronze fills the same cavity which was previously occupied by the clay, and forms a metallic covering to the core. It is afterwards made smooth by mechanical means.

BRONZING. Bronze of a good quality acquires by oxidization a fine green tint, called *patina antiqua*, or, by the Romans, *ærugo*. Sal-ammoniac and salt of sorrel dissolved in vinegar, and applied with a soft rag or brush, will produce this result. The process must be repeated several times to have its full effect. The proportions given by Dr. Ure are three-fourths of an ounce of sal-ammoniac, and a drachm and a half of salt of sorrel, to a quart of vinegar. Bronzing is also the process by which a body of plaster, wood, or metal is made to receive a bronze-like surface. Brass castings are bronzed by the application, after cleaning and brightening them, of vinegar and sal-ammoniac. A variety of liquid solutions are prepared for bronzing copper and other metals, in which verdigris, sal-ammoniac, salt of sorrel, cinnabar, alum, and common salt are employed. To bronze wood and other articles, waste gold-leaf, ground in with honey and washed, or mosaic gold ground with bone ashes, is applied, with size or oil varnish. Gypsum casts are bronzed with black-lead. This appearance is imitated by an artificial process called *bronzing*.

BRONZINO, ANGELO, a painter of the Florentine school, was born near Florence in 1501 or 1502; died 1570 or 1572. He was a pupil of Jacopo da Portormo, and an admirer and imitator of Michael Angelo. He painted a great number of portraits; and his historical paintings are distinguished by the striking and pleasing features of the heads which they contain. One of his best paintings is a Christ in the church Santa Croce, at Florence. It is remarkable for its grouping and colouring, as well as for the heads, many of which are the portraits of his friends and contemporaries; yet it is not altogether free from mannerism and

affectation. Some persons have found fault with the nakedness of his figures.

BROOCH, anything which will pierce through; a pin; that part of certain ornaments by which they are stuck on; the ornament itself. Brooches are of great antiquity, and were formerly worn by men as well as women. They were used by both sexes among the Greeks and Romans, and also in the middle ages. Among the Highlanders of Scotland there are preserved, in several families, ancient brooches of rich workmanship and highly ornamented. Some of them are inscribed with characters to which particular virtues were attributed, and seem to have been used as a sort of amulet or talisman.

BROODING. See INCUBATION.

BROOKE, HENRY, dramatist and novelist, the son of an Irish clergyman, was born in 1706; died 1783. He was educated at Dublin University, and intended for the law. When very young he marred his prospects by falling in love with his cousin, who was only fourteen when she presented him with his first child. She was afterwards the mother of other sixteen, and lived in perfect harmony with him for the long period of fifty years. Brooke began to practise at the bar; but his taste was decided for poetry and general literature, and he came forward as an author by publishing a tragedy called Gustavus Vasa, which was remarkably popular at the time, and was translated into French, though it is now almost forgotten. He wrote several other tragedies, and also several novels, one of which, the Fool of Quality, possesses considerable merit, and was republished with a preface by Rev. Charles Kingsley. The death of his wife, and the loss of a favourite child, completely broke his spirit, and he lived for a short time in a state of second childhood.

BROOKE, SIR JAMES, celebrated as the Rajah of Sarawak, was born in Bengal in 1803; and died at Baraton, in Devonshire, 11th June, 1868. He was brought at an early age to England, and having completed his education there he obtained a cadetship in the Indian army. He distinguished himself in the Burmese war (1826), and was so severely wounded that he had to come home to England for the benefit of his health. On his way back to India he was shipwrecked, and having thus exceeded his leave of absence and forfeited his appointment, he gave up thoughts of a military career, and sailed on to China. On this voyage there rose in his mind the idea of ridding the Eastern Archipelago from the scourge of piracy, and ameliorating the condition of the inhabitants. Accordingly on his return to England, having come into the possession of a large fortune by the death of his father, he bought one of the royal yachts, named the *Royalist*, and after a preliminary cruise in the Mediterranean, set sail for the East (Oct. 1838). Having directed his course to the island of Borneo, he found Muda Hassim, uncle of the King of Borneo, and Rajah of Sarawak, a district on the N.W. coast of the island, engaged in suppressing a revolt. The rajah being hard pressed, agreed to make him his successor in return for his assistance. The offer was accepted, Brooke took command of the rajah's army, and speedily reduced the rebels to submission. Being now established in the government, and recognized as Rajah of Sarawak by the Sultan of Borneo (1841), he endeavoured to induce the Dyak natives to abandon their irregular and piratical mode of life, and to turn themselves to agriculture and commerce. For this end he published a code of laws, establishing free trade and personal equality, and declaring piracy a crime punishable with death. His efforts were wonderfully successful. In conjunction with the British naval commanders he carried on war against the pirates with great vigour. A sum of money was paid by government for the head of each pirate, and under this system the Malay rovers were soon almost extirpated. The severity of this war of extermination gave rise to a certain degree of dissatisfaction in England; but notwithstanding this, on his return in 1847, Mr. Brooke was received with general favour, his position was recognized by the government, he received the honour of Knight Commander of the Bath, and was made governor of Labuan, an island near Sarawak which had been acquired by the British. After his return to Borneo he continued to labour as before for the extension of British influence. In 1850 he went as ambassador to Siam, and not long after he gave up his post as governor of Labuan. On the outbreak of the war with China in 1857, his residence was suddenly attacked by about 4000 Chinese, and he himself only escaped by swimming across the river. His adherents soon rallied, however, and at the head of a large body of Malays and Dyaks he drove the Chinese from Sarawak with the loss of half their number. The following year he came to England to recruit his health. He returned to Borneo in 1860. In 1863 he finally returned to England, leaving the government in the hands of his nephew, Charles Brooke. Whatever may be thought of the policy of Sir James Brooke, there can be no doubt as to the benefits derived from it by the people of Sarawak. He established civilization and opened up a trade where previously they had scarcely any existence. Under his administration Sarawak increased from a village of 1000 inhabitants to a town of 16,000, while the trade increased in the same proportion.

BROOKLYN, a city and sea-port, New York state, on the W. end of Long Island, separated from the city of New York by East River, a strait about three-quarters of a mile broad, crossed by a number of steam ferries, the principal of which is Fulton Ferry. A bridge is being built across this strait, for a description of which see BRIDGE. Pop. in 1860, 266,661; in 1870, 396,661. Brooklyn is one of the finest cities in the United States, with broad, straight streets, many of them planted with rows of trees. The site is elevated and uneven, and has caused much labour to be expended in grading. A prominence near the East River called the Heights, 70 feet above the sea level, affords a magnificent view of the city and harbour of New York. Among the public buildings are the city hall of white marble, the jail, the lyceum, the county court-house, the academy of music, and about 170 churches. The literary and charitable institutions are very numerous. The Atlantic Dock is one of the largest in the States, covering 40 acres. It is one of the largest grain depots in the world. The outer pier in Buttermilk Channel extends for 3000 feet. This channel, formerly a narrow passage, is now of sufficient width to admit the largest vessels. The United States navy-yard, on Wallabout Bay, occupies 45 acres, and the dry dock connected with it cost $1,000,000. Brooklyn is a favourite residence of the wealthy New Yorkers. On the breaking out of the civil war a great part of the tobacco manufacture of Richmond was transferred hither. It has a large trade in flour, sugar, whisky, and manufactures of various kinds. It was founded in 1625, and was the scene of several memorable events of the revolution.

BROOM, a popular name which includes several allied genera of plants of the natural order Leguminosæ, and of the sub-order Papilionaceæ, plants distinguished by a leguminous fruit and papilionaceous flowers. The common broom (*Cytisus scoparius*) is a large bushy shrub, with long straight angular branches, of a dark-green colour, smooth and tough. Its leaves are deciduous. The flowers are of a deep golden yellow colour, large, and butterfly-shaped. This is a handsome shrub, and one of the most useful of

the common plants of Great Britain. Its twigs are tied in bundles, and formed into brooms. Some persons roast the seeds, and make them into a kind of coffee. The fibrous and elastic parts of the bark, separated by soaking in water, may be manufactured into cordage, matting, and even into a coarse kind of cloth. The twigs and young branches have been successfully employed as a substitute for oak-bark in tanning leather. They may also be rendered serviceable as thatch for houses and corn-ricks; and some persons mix them with hops in brewing; but it is doubtful whether, in this respect, they are wholesome. The flower-buds, when pickled, have occasionally been used as a substitute for capers. The wood, when the dimensions are sufficient for the purpose, is employed by cabinetmakers for veneering; and it is stated by Dr. Mead, that a decoction of the green tops, in conjunction with mustard, has been found efficacious in the cure of dropsy.—*Spanish Broom*, or *Spart* (*Spartium junceum*), is an ornamental flowering shrub, growing in Africa, Spain, Italy, and the S. of France, where it is often made use of to turn dry, unfertile soils or exposed slopes to account. It is also common in English gardens; has upright round branches, that flower at the top, and spear-shaped leaves. In the province of Valencia, and other parts of Spain, great attention is paid to the manufacture of various articles from the twigs and bark of this shrub. They are plaited into mats, carpets, covering for plants, baskets, ropes, and even shoes. There are various other species of broom besides those enumerated.

BROSELEY, a market town, Shropshire, England. The town is situated on the summit of a hill, rising abruptly from the Severn, 13 miles S.E. of Shrewsbury, and consists chiefly of one street, straight and well kept; but the other parts of the town are extremely irregular. It has a handsome town-hall, a beautiful Gothic church, various Dissenting chapels, several schools, and manufactures of tobacco-pipes, tiles, and fire-bricks, for which this place has long been noted. Pop. in 1871, 4639.

BROSSES, Charles de, first president of the Parliament of Burgundy, was born at Dijon in 1709; died in 1777. He applied himself to the study of law, and at the same time did not neglect the arts and sciences. His intimate acquaintance with Roman history produced in him a desire of visiting Italy, whither he went in 1739. On his return he published his Letters on the Condition of the City Herculaneum (Dijon, 1750). At the request of Buffon, who had been his friend from youth, he wrote a History of the Voyages to Australasia (Histoire des Navigations aux Terres Australes), 1756. In 1760 appeared his treatise, published anonymously, Du Culte des Dieux Fetiches. A work of a very different kind succeeded this, and displayed the extent and variety of the author's learning. This was a Treatise on the Mechanical Formation of Languages (Traité de la Formation Mécanique des Langues), 1765. It contained, together with many imperfections, numerous curious and profound investigations, ingenious conjectures, and penetrating views. De Brosses employed himself, through his whole life, on a work which was held in no slight estimation by the learned. This was a translation of Sallust, in which he laboured to supply the lost parts of this historian. For this purpose he collected above 700 fragments of Sallust, by means of which, with some important additions, he composed a history of the seventh century of the Roman Republic, displaying a great extent of erudition (Histoire de la République Romaine, dans le cours du 7e siècle), Dijon, 1777. The work would have been received with greater approbation if the graces of style had been joined to the depth and sagacity of research which it manifests. Though these various labours claimed a large portion of his time, yet they did not hinder him from attending to the duties of his office.

BROTHERHOOD, Holy. See Hermandad.

BROTHERHOODS. See Fraternities.

BROTHERS, male children of the same father or mother, or both. Among the ancients the term was employed to denote more remote relations. Thus, among the Jews, Abraham was called the brother of Lot, his nephew. By the civil law, brothers and sisters stand in the second degree of consanguinity; by the canon law, they are in the first degree. In the monastic and military orders the members were called brothers, as being united in one family. In Europe, the kings address each other by the title of brother.

BROTHERS, Richard, a fanatic and self-styled prophet, began his career about 1793, and died in 1824. He served as a lieutenant in the army, which he quitted in 1789, refusing from conscientious scruples to take the oath necessary to entitle him to his half-pay. He was consequently reduced to distress, and ultimately had to take refuge in the workhouse. He announced himself in 1793 as the apostle of a new religion, dating his call from 1790. He styled himself the 'Nephew of the Almighty, and Prince of the Hebrews, appointed to lead them to the land of Canaan.' He published, in 1794, A Revealed Knowledge of the Prophecies and Times, in two books. Book 1, 'wrote under the direction of the Lord God,' relates to the restoration of the Hebrews. Book 2 contains the 'Sudden and Perpetual Fall of the Turkish, German, and Russian Empires,' &c. Many other works followed, among which one is worth mentioning for its oddity: A letter to Miss Cott, the recorded daughter of King David, and future Queen of the Hebrews. Brothers' prophetical career coming under the notice of government, he was first committed to Newgate for prophesying the death of the king, and subsequently to Bedlam as a dangerous lunatic, but was released in 1806. Strange to say, he had found followers and defenders even among the ranks of educated men. Some particular events in European history appeared to coincide with some of his prophecies, and this caused all their absurdities and blasphemies to be forgotten or overlooked. Among his disciples was Sharp, the celebrated engraver, and a man of still greater distinction, Nathaniel Brassey Halhed, the orientalist, then member of Parliament for Lymington, who avowed in the House of Commons his belief in the prophetic powers of Brothers, and denounced his imprisonment as persecution.

BROUGHAM, Henry, Baron Brougham and Vaux, was born at Edinburgh on the 19th September, 1778; died at Cannes 7th May, 1868. His father, Henry Brougham, belonged to an old Westmoreland family, and his mother, Eleonora Syme, was a niece of Robertson the historian. He was educated at the High School and the University of Edinburgh, entering the latter at the age of sixteen. At the early age of eighteen he wrote an essay on the Refraction and Reflection of Light, which, being sent to the Royal Society, was thought worthy of being printed in their Transactions for 1796. He contributed a paper to each of the next two volumes of the Royal Society's Transactions also. On leaving college he devoted himself to the study of law at Edinburgh, and was admitted a member of the Society of Advocates in 1800. As a member of the Speculative Club he was brought into contact with Jeffrey, Horner, and others afterwards famous; and along with the above-mentioned writers and Sydney Smith bore a chief part in the starting of the Edinburgh

Review in 1802, to which he contributed a great number of articles. In 1803 appeared his Inquiry into the Colonial Policy of the European Powers (Edin. two vols.), a work which showed a wide extent of knowledge in the author, and drew upon him considerable attention. In it he expressed his decided hostility to the slave-trade. Finding too circumscribed a field for his abilities in Edinburgh, he removed to London, and in 1808 was called to the English bar. One of the first occasions on which he distinguished himself in his professional capacity was in 1810, when he spoke before the House of Lords in behalf of some Liverpool merchants who wished the repeal of the 'Orders in Council,' prohibiting trade with the states subject to France. The same year he entered Parliament as member for the rotten borough of Camelford, joined the Whig party, which was in opposition, and soon after obtained the passing of a measure making the slave-trade felony. He also succeeded, before the dissolution of Parliament, in getting the Orders in Council repealed. At the general election in 1812 he endeavoured to get himself elected as one of the members for Liverpool, but was defeated by Canning, and remained without a seat till 1816, when he was returned for Winchelsea. He represented this borough up to 1830. On his return to Parliament he began his life-long efforts in the cause of education by obtaining the appointment of a committee to inquire into the state of education among the poor of the metropolis. In 1819 he and his friends established a model school for the children of the poorer classes in London. In 1823 he was instrumental in founding the first mechanics' institute. In 1825 he published his Practical Observations upon the Education of the People, which ran through twenty editions. The same year he was elected Lord Rector of Glasgow University; and also introduced a bill into Parliament for the incorporation of the London University, of which he may be considered one of the chief founders. He also bore an active part in establishing the Society for the Diffusion of Useful Knowledge in 1827, the first publication of which was his Discourse on the Objects, Pleasures, and Advantages of Science. Meantime his reputation as a brilliant speaker and able advocate had been gradually increasing, and his fearless and successful defence of Queen Caroline in 1820 and 1821 placed him on the pinnacle of popular favour. Two of the speeches spoken by him in this course are looked upon as classic specimens of English eloquence. The part he took in defence of the queen brought him into disfavour with the king, however, and delayed his promotion some years, so that it was not till 1827 that he was made a king's counsel. In Parliament he continued to speak against negro slavery, and in favour of what may be considered the most valuable of the reforms that we owe to him, viz. the amendment of the common law and of the judicial administration. On this subject he delivered a famous speech of six hours' duration, on Feb. 7, 1828. At the general election of 1830 he was returned for the large and important county of York, an honour which he attributed chiefly to a celebrated speech delivered by him shortly before on the slave-trade. In the ministry of Earl Grey he accepted the post of lord-chancellor, and was raised to the peerage (22d Nov. 1830) with the title of Baron Brougham and Vaux. The Reform Bill of 1832 received his warmest support in the House of Lords. In 1834, when the Whig ministry were dismissed, Lord Brougham of course lost the chancellorship, and this proved the end of his official life, as he was never afterwards a member of any ministry. Henceforth he devoted himself chiefly to legal and social reforms, maintaining, we need scarcely say, his hostile attitude to slavery, and continuing his labours in the cause of popular education. He was a zealous opponent of the corn-laws. In connection with the acts of his later years, we may mention his presidency of the Law Amendment Society, and of the Social Science Association. He latterly resided much at Cannes, in the S. of France, where he died. He married in 1819, and had two daughters, one of whom died in infancy in 1820, the other in 1839, at the age of seventeen. His wife was Mary Anne Eden, daughter of Thomas Eden, Esq., and grand-daughter of Sir Robert Eden, Bart., of West Auckland, in the county of Durham.—Lord Brougham accomplished a large amount of literary work, contributing to newspapers, reviews, and encyclopedias, besides writing several independent works; and he had no mean reputation in mathematics and physical science. His works, collected by himself, and published in ten vols. (Edin. 1855–57), include—1st. Lives of Men of Science, time of George III.; 2d. Lives of Men of Letters, time of George III.; 3d, 4th, and 5th. Eminent Statesmen; 6th. Natural Theology; 7th. Rhetorical and Literary Dissertations and Addresses; 8th. Rhetorical and Political Dissertations; 9th and 10th. Speeches on Social and Political Subjects. He also, along with Sir Charles Bell, brought out an edition of Paley's Natural Theology; translated the oration of Demosthenes On the Crown; and in 1855, conjointly with Mr. E. J. Routh, published an Analytical View of Sir Isaac Newton's Principia. Besides being chosen Lord Rector of Glasgow University, he was president of University College, London, chancellor of Edinburgh University, D.C.L. of Oxford, and a member of the Institute of France. Lord Brougham must be looked upon as one of the most remarkable men of this century. His energy and industry were enormous, his versatility surprising. He was a mathematician, a historian, a biographer, an essayist, a moral and political philosopher, a lawyer, an orator, and a statesman. It is chiefly in the latter capacities that he will be remembered. As an orator and parliamentary debater he was inferior to Canning alone. In rapid and forcible diction he was unsurpassed; and when argument, invective, sarcasm, wit, and humour were all mingled together—and the words came rushing forth, every one true to the mark—it was no wonder that Lord Brougham was a most formidable opponent.

BROUGHTON, Lord, the Right Hon. Sir John Cam Hobhouse, G.C.B., P.C., F.R.S., Baron Broughton, of Broughton de Gyfford, in the county of Wilts, and a baronet; born 27th June, 1786; died 3d June, 1869; was the son of Sir Benjamin Hobhouse, first baronet, and of Charlotte, daughter and heiress of Samuel Cam, Esq., of the Chantry, Wilts. He was educated at Westminster School and Trinity College, Cambridge, where he graduated B.A. in 1808, and M.A. in 1811. He was an intimate friend of Lord Byron, and accompanied him in his travels to Greece and Turkey in 1809. He published in 1812 an account of this voyage, entitled Journey into Albania and other Provinces of the Turkish Empire. In the years 1813 and 1814 he accompanied the allied armies in Germany, and was present at the battle of Dresden. He also accompanied Byron to Italy in 1816–17, and visited Rome and Venice together with him. He suggested an extension of the fourth canto of Childe Harold, which Byron dedicated to him, and by arrangement with the poet he undertook to write for it a series of notes, for which his observations during their journey furnished materials. These notes were written at Venice, where he had the advantage of the ducal library, and were so expanded with dissertations on history, architecture, &c., as ultimately to form a separate work,

which was published by Murray in 1818: Historical Illustrations of the Fourth Canto of Childe Harold, containing Dissertations on the Ruins of Rome, and an Essay on Italian Literature. Hobhouse was an advanced Liberal in politics, and on his return to his country took an active part in the advocacy of reforms, chiefly by means of anonymous pamphlets and articles in the Whig reviews and newspapers. In 1816 he published anonymously in two 8vo volumes, The Substance of some Letters written by an English Gentleman resident at Paris during the last reign of the Emperor Napoleon. The received accounts of the history of the Hundred Days were in his opinion inaccurate, and opposed to liberal principles, and he professed in these letters to give a true account of occurrences as they actually took place. This work, from its hostility to the Bourbon cause, gave great offence to the existing governments both in France and England. A French translation having been published, the translator and publisher were each sentenced to pay a fine of 1000 francs, while the former was imprisoned for twelve, and the latter for six months. The controversy to which it gave rise in England occasioned several anonymous pamphlets and letters, in which Hobhouse continued his advocacy of liberal views. One of these, written in reply to Lord Erskine, and called the Trifling Mistake, being charged in the House of Commons with advocating rebellion, he came forward to acknowledge the authorship, and was, by the speaker's warrant of 13th December, 1819, arrested on the following day, and committed to Newgate. In this pamphlet he said, 'If the government try to deprive me of my inalienable right of meeting my fellow-countrymen by letting loose a soldier at me without the warning of an act of Parliament, I will resist him if I can; and if they do give me the warning of an act of Parliament, I will break it if I can.' The death of George III. at the beginning of 1820 caused a dissolution of Parliament, and after a short delay he was released. At the general election that year he was returned for Westminster, which he had previously contested unsuccessfully with Mr. George Lamb, brother of Lord Melbourne. Soon after his election he defended the Liberals of Oldham against an aggression on the part of the cabinet of Lord Liverpool, which had put down by force a great reform meeting in that place. He supported the Reform Bill of 1832, the repeal of the Test and Corporation Acts, the removal of the Catholic disabilities, and other liberal measures of the period. In Feb. 1832, he entered Lord Melbourne's ministry as secretary at war, and became a privy-councillor. In 1833 he was made chief-secretary for Ireland, but lost his seat in seeking for re-election. On the reconstruction of the cabinet under Lord Melbourne in 1834, he was made chief commissioner for woods and forests, and was elected for Nottingham. The ministry resigned in autumn, and returned to power in April, 1835, when he was appointed president of the board of control. He held this office till Sept. 1841, and in Lord Russell's administration, 1846–52. He lost his seat for Nottingham in 1847, when he was at the bottom of the poll, but a seat was found for him at Harwich, which he continued to occupy till he was raised to the peerage in 1851. He had succeeded his father as baronet in 1831. From the time of his elevation to the peerage he took less interest in political affairs, and he rarely spoke in the House of Lords. During his retirement he returned to the literary tastes of his youth, to the cultivation of the classics, of which he was always an admirer, and to the enjoyment of the society of a large circle of friends. Lord Broughton married in 1828 Lady Julia Hay, youngest daughter of the Marquis of Tweeddale, who died in 1835. He had three daughters, but as he left no male issue, the peerage became extinct. Besides the works referred to, Lord Broughton published Imitations and Translations from the Ancient and Modern Classics, together with Original Poems (London, 1809).

BROUGHTY-FERRY, a marine town and watering place in Scotland, county Forfar, N. shore of the estuary of the Tay, 3 miles E. Dundee; on the Dundee and Arbroath section of the Caledonian Railway, and connected with the Fife section of the North British by the ferry across the Tay, from Ferry-port-on-Craig. The houses are of stone, and generally well built, while many of those of modern erection are extremely neat and tasteful. Handsome villas, in various styles of architecture, but chiefly Elizabethan, belonging to Dundee merchants and manufacturers, are also numerous. Several of the churches are elegant structures. The only manufacture carried on here is that of coarse linens, in which only a few weavers are employed. It is a condition in many of the feus that no manufacturing works be erected. A great portion of the working population is employed in fishing for supplying the Dundee market. At the E. extremity of the village, on a rocky eminence projecting into the sea, stands the old castle of Broughty, when or by whom built is unknown. Pop. in 1871, 5817.

BROUNCKER, or BROUNKER, WILLIAM, born in 1620, became Viscount Brouncker of Castle-Lyons, in Ireland, by the death of his father, on whom that title had been conferred. He was strongly attached to the royal cause, and in 1660 was one of the first to sign the declaration which hailed Monk as the restorer of the laws and privileges of the nation. On the Restoration he was appointed to several lucrative offices, and on the formation and incorporation of the Royal Society became its president. This honourable office he continued to hold for fifteen years. His mathematical attainments must have been of a high order, as he is admitted to have been the discoverer of what are called Continued Fractions, and of an important theorem relating to the quadrature of the equilateral hyperbola. He also published Experiments on the Recoiling of Guns, and a translation of Descartes' Musicæ Compendium, with notes exhibiting an intimate acquaintance with the science of music. He died in 1684.

BROUSSON, CLAUDE, born at Nismes in 1647, was educated for the law, and practised as an advocate first at Castres and Castelnaudary, and afterwards in the Parliament of Toulouse, where the Protestants, to whom he belonged, were often indebted to him for the zeal and ability with which he defended their cause. In 1683, when the government had resolved on recalling the edict of Nantes, and trying the effect of persecution as a means of suppressing the Reformation, it was at Brousson's house the deputies from all the churches assembled, and resolved that, even were their temples destroyed they would still hold their meetings, though it should be under the canopy of heaven. His part in this and other important movements marked him out as one of the first objects of attack; and on receiving warning of an intention to arrest him, he sought an asylum at Lausanne, where he published several works, exposing the persecutions to which the Protestants of France were subjected, and awakening the sympathy of their brethren in all other parts of Europe. Nor was he satisfied merely to aid the cause with his pen. At the hazard of his life he returned to France, and continued for four years among the recesses of the Cevennes, preaching the gospel. In 1693 he repaired to Holland, where a pension was given him by the states-general; and he might easily have led

a life of ease and comfort, but the sufferings of his persecuted countrymen were ever uppermost in his mind, and he both visited many of the courts of Europe to plead their cause, and repeatedly revisited France for the purpose of administering instruction and comfort, and urging to perseverance. So much zeal was evidently a prelude to the martyr's crown, and accordingly, on a mission into France, he was arrested at Oleron, tried at Montpellier, condemned to be broken on the wheel, and executed accordingly in 1698.

BROUSSONET, Pierre Marie Auguste, a distinguished naturalist, born at Montpellier in 1761; died in 1807. After studying medicine at Montpellier under his father, he visited Paris, where he devoted himself particularly to natural history; and with the view of prosecuting it passed over into England and studied ichthyology under the direction of Sir Joseph Banks. After three years' residence in England he returned to France, and became the assistant of Daubenton in the College of France and the veterinary school. At this period he communicated a number of valuable papers to the Academy of Sciences, and obtained a seat in its body. In 1785 he was appointed secretary to the Paris Agricultural Society, and turning his attention to the objects specially embraced by it, wrote or contributed to several important works of a practical nature. The first flock of merinos from Spain, and of Angora goats from the Levant, was introduced by him. The revolution now broke out, and he became connected with the party of the Girondists. On the downfall of that party he was arrested at Montpellier, but having escaped, crossed the Pyrenees under the pretext of botanizing, and arrived in Spain in a state of great destitution. Sir Joseph Banks, on being informed of it, generously sent him a letter of credit for a sum sufficient to meet all his wants. He afterwards set sail for the Indies in an English vessel, which was driven back by a storm into the port of Lisbon. He next passed over into Africa as physician to Mr. Simpson, ambassador of the United States to the Emperor of Morocco, and resumed his botanical studies, making some important collections, which he sent to Sir Joseph Banks. Circumstances now permitted his return to France, where he was appointed consul to Mogador and traveller to the Institute. He also received the appointment of consul to the Canaries, where he resided for some time, and collected materials for his work Economical Flora of the Canaries, which describes 1600 plants. He next returned to France to occupy the chair of botany at Montpellier. In 1805 he became a member of the corps legislatif. He died from the effects of a fall by which the brain had been seriously injured. This is said to have had the curious effect of causing him to lose his memory for proper names and other substantives, while he had still an abundance of adjectives at his command. In compliment to him a class of dioecious plants, from which the Chinese manufacture paper and the South Sea islanders the greater part of their clothing, has been named Broussonetia.

BROUWER, or Brauwer, Adriaan, a celebrated painter, of the Dutch school, was born at Haarlem, in 1608, or more probably at Oudenarde, where his father was a painter of common paper-hangings. He died in hospital at Antwerp, in 1640. Poverty contributed, perhaps, to form his talents. When a child, he painted flowers and birds to be stitched on caps, which were sold by his mother. Francis Hals, a skilful painter, expecting to profit by the talents of the young artist, took him to Haarlem. Here, amidst wearisome labours and poor diet, Brouwer spent the greater part of his time in a garret, occupied in making little paintings of the value of which he was ignorant, while Hals kept the profits of them for himself. Two pretty paintings of his, The Five Senses and The Twelve Months, are mentioned as belonging to that period. By the advice of Adrian of Ostade, his fellow pupil, he escaped to Amsterdam, where he was surprised to hear that his paintings were esteemed. He now gained considerable sums by his labours; but instead of devoting himself to his art, he made the inn his workshop, never exerting himself till the hostess insisted upon payment. He threw into the fire a painting for which he did not receive the price demanded, and began a new one with more care. Having gone to Antwerp during the wars of the Low Countries, he was thrown into prison as a spy. He declared that he was a painter, appealing to the Duke of Ahremberg, who was likewise imprisoned there; and at the prince's intercession, having been provided with materials, he painted his guards playing at cards, with so much expression and truth, that Rubens, at the sight of the picture, exclaimed, 'This is Brouwer's work; none but he can succeed so well in such subjects.' Rubens effected his release by standing bail for him, clothed him, and received him into his house and at his table. Brouwer, however, instead of being grateful for this generosity, escaped secretly, to plunge into still greater extravagances. He took lodgings with a baker, Craesbeke, who became a skilful painter by his instructions. This man, whose inclinations agreed with those of Brouwer, had a handsome wife, and the connection between these three persons became so intimate, that they were obliged to flee from justice. Brouwer went to Paris, but finding no employment there returned to Antwerp, where he died. Rubens, who remembered only his talents, caused him to be honourably buried in the church of the Carmelites. All the pictures of Brouwer show what sort of places and company this artist frequented. He did not, however, like Teniers, understand how to give to mean objects the variety of which they are susceptible. Nevertheless, his paintings command high prices from amateurs. It would indeed be difficult to excel Brouwer in power and harmony of colouring, in the management of the *chiaroscuro*, and in truth of expression.

BROWN, Charles Brockden, an eminent American novelist, was born in Philadelphia in 1771; died 1810. He descended from a family of Quakers, was remarkable in his childhood for his attachment to books, and at the age of sixteen, after having received a liberal education, had already formed plans of extensive literary works. The profession of which he made choice was the law. He was apprenticed to an eminent member of the Philadelphia bar, but during the term intended for preparatory legal study, was, in fact, principally occupied with literary pursuits. The delicacy of his constitution, moreover, incapacitated him for the bustle of business and athletic amusements. During frequent visits to New York he became intimate with a literary club, who fostered his devotion to letters, and increased his eagerness to be conspicuous as a writer. He kept minute journals, indited essays and dissertations, and cultivated, with unremitting assiduity, the arts of composition. The first novel which he wrote was entitled Sky Walk, but it was never published. His first published novel was called Wieland, and appeared in 1798. It soon acquired the reputation of a powerful and original romance. The next published, in the following year, was Ormond, or the Secret Witness, which had neither the success nor the merit of the other, but still exhibits uncommon power of invention and description. At this time Brown had begun no less than five novels, two of which—Arthur Mervyn and Edgar Huntley—were com-

pleted and sent forth almost immediately. In Arthur Mervyn, the ravages of the yellow fever, which the author had witnessed in New York and Philadelphia, are painted with terrific truth. All these compositions abound both with excellencies and faults, and bear a character of originality. In 1801 he published another novel—Clara Howard—less open to exception, but also less deserving of praise. Its form is different from that of the others, being epistolary. The last of his novels was Jane Talbot, originally published in London, in 1804. It is deficient in interest, and indeed in all respects inferior to its predecessors. In April, 1799, Brown published the first number of the Monthly Magazine and American Review. This work he continued with great industry and ability until the end of the year 1800. He wrote abundantly for it. Circumstances compelled him to relinquish it; but in 1805 he commenced another journal, with the title of the Literary Magazine and American Register; and in this undertaking he persevered for five years. In 1806 he entered upon a new work, a semi-annual American Register, five volumes of which he lived to complete and publish. It is now and must long be consulted as a valuable body of annals. We have already mentioned the delicacy of Brown's constitution. In 1809 it was discovered that his lungs were seriously affected, and he then consented to travel for the recovery of his health. The remedy, however, was applied too late. In November of that year, after an excursion into the states of New Jersey and New York, he betook himself to his chamber, as he thought, for a few days; but his confinement lasted until February, and ended only with his life. He expired on the 22d of that month, at the age of thirty-nine. His writings are characterized by rich diction, variety of incident, and vivid representation, but he deals too much in the extravagant and the horrible.

BROWN, George, Count, an Irishman, field-marshal in the service of Russia, was born in 1698; entered the Russian service in 1730, and died in 1792. He distinguished himself in several wars, and Peter III. made him governor of Livonia, in which post he remained thirty years. He was not less honoured by Catharine II.

BROWN, John, an eminent and learned minister at Haddington, who was born in Perthshire in 1722, and died 19th June, 1787. By his own intense application to study he became acquainted with the French, Italian, German, Arabic, Persian, Syriac, and Ethiopic languages, as well as the Greek and Hebrew. Notwithstanding this great acquisition of knowledge, it is said he was never under the tuition of a master, except about a month. In summer he rose between four and five in the morning; in winter at six; and prosecuted his studies till eight in the evening. The hours which thousands waste in sleep he occupied in prayer, reading, or writing. In general he preached three sermons every Sabbath-day. He was accounted very liberal as to his property, and was of opinion that every man ought at least to give the tenth of his income to charitable purposes. He was appointed professor of theology to the Associate Synod in 1768. His most important works are: The Self-interpreting Bible; Dictionary of the Bible; Explication of the Assembly's Catechism; The Christian Journal; Explication of Scripture Metaphors; System of Divinity; General History of the Church; Particular History of the Churches of England, Scotland, and Ireland; and Harmony of Scripture Prophecies. His Dictionary of the Bible and Self-Interpreting Bible, so called from the copious marginal references to other passages of Scripture by which it is distinguished, have gone through many editions.

BROWN, John, M.D., the author of the Brunonian system in medicine, was born in the parish of Bunkle, in the county of Berwick, in the year 1735; died in London, 1788. His parents were in a very humble sphere in life, his father being merely a day labourer. Like the children of other Scottish cottars, however, he received the advantage of being educated at the parish-school, where he was very soon distinguished for his abilities, and the rapid progress he made in his studies. His father having died, his mother married a weaver, and young Brown was bound an apprentice to that business; but the distaste he evinced for it was so great as to induce his step-father to cancel his indentures, and remove him to the grammar-school of Dunse, where he was looked upon as quite a prodigy—reading all the Latin authors with the greatest facility, and soon making considerable progress in Greek. In 1755 he went to Edinburgh, with the intention of studying divinity and entering the church, but he soon abandoned his theological studies. Having been employed by a medical student to translate his thesis into Latin, he succeeded so well, that the elegance and purity of the language attracted the notice and encomiums of the professors and led to his commencing the study of medicine. Dr. Cullen in particular was soon attracted by his remarkable talents, and employed him as a tutor to his sons. In the year 1765 he married, and opened a boarding-house for the accommodation of medical students; but being irregular and intemperate in his habits he was soon reduced to bankruptcy. A professor's chair now fell vacant, for which he became a candidate, but, being unsuccessful, he attributed his want of success to the jealousy of Dr. Cullen, and a rupture ensued between them. Having taken the degree of Doctor in Medicine at St. Andrew's, he commenced practice in Edinburgh, and produced his celebrated work, entitled the Elements of Medicine. He then commenced lecturing on the practice of physic, and made use of this work as his text-book. He divided all diseases into two classes, those resulting from a deficiency, and those resulting from an excess of excitement; the one class to be treated with stimulants, the other with debilitating medicines. Becoming involved in pecuniary embarrassments he removed to London in 1786, where he died two years later. The system of physic which he taught, though no longer accepted as a system, had a distinct influence on subsequent practice.

BROWN, Lancelot, a celebrated landscape gardener and improver of grounds, sometimes called 'Capability Brown,' was born in 1715, at Kirkharle, in Northumberland; died in 1773. He commenced life as a kitchen gardener, but, by his industry and genius, rose rapidly in public estimation till he came to be regarded as a kind of oracle in taste in regard to all rural improvements, agricultural, horticultural, and even architectural. His extensive employment enabled him to realize a handsome independence, and he adorned the station to which he had worked his way with more graces and virtues than are often displayed by those who have been born to it. He obtained the dignity of high sheriff of Huntingdon in 1770. He avoided the stiff formality of the older landscape gardens, but is charged with having often sinned against good taste by endeavouring to reform natural scenery, and force it, under all circumstances, to assume the form of clumps, belts, and serpentine canals. His architectural performances are less remarkable for their exterior than for their interior, and have been regarded as models of convenience and comfort.

BROWN, Robert, the founder of a religious sect first called *Brownists*, and afterwards *Independents*,

was born of an ancient family in Rutlandshire, and studied at Cambridge, where, in 1580, he began openly to attack the government and liturgy of the Church of England as anti-Christian. He first ascended the pulpit at Norwich in 1581, where he succeeded in converting a number of Dutch, who had a congregation there, to his opinions, for which he was brought before the ecclesiastical commissioners, to whom he behaved so rudely that he was sent to prison, but soon obtained a release. He then went to Middleburg, in Zealand, with his followers, and wrote a book called A Treatise of Reformation without Tarrying for any Man. In 1585 he returned to England, and as he still laboured to gain converts, he was excommunicated by the Bishop of Peterborough. This censure, joined perhaps with the evaporation of his zeal, induced him to submit; and in 1590 he was presented to a living in Northamptonshire, of which he received the emoluments without discharging the duties. In other respects, too, his morals were licentious, so that he retained little of the austerity of the founder of a sect. After leading a turbulent life, this extraordinary person died in 1630, in Northampton jail, where he had been sent for assaulting a constable and insulting a magistrate. This was by his own account his thirtieth imprisonment. The sect of Brownists, far from expiring with their founder, soon spread so as to become a subject of great alarm; and a bill was brought into Parliament which inflicted on them very severe pains and penalties. In process of time, however, the name of Brownists was merged in that of Congregationalists or Independents, under the latter of which titles they formed a powerful party in the Commonwealth.

BROWN, ROBERT, botanist, born at Montrose, 21st December, 1773; died in London 10th June, 1858; was the son of a Scotch Episcopalian clergyman. He received his education at Marischal College, Aberdeen, and afterwards studied medicine at Edinburgh. He finished his education in 1793, when he received the appointment of assistant-surgeon in a Scotch fencible regiment, which he accompanied to Ireland, where he remained till 1800. He was then, through the influence of Sir Joseph Banks, appointed naturalist to Captain Flinder's surveying expedition to New Holland. The whole continent of Australia was circumnavigated, the coast at various points examined, and Brown remained in the colony, visiting various parts of New South Wales and Van Diemen's Land, till 1805. He returned with nearly 4000 species of plants, was shortly after appointed librarian to the Linnæan Society, and was now able to devote himself to the systematic study of his plants. He continued to make the result of his investigations known in communications to the Linnæan and Royal Societies. One of his earliest papers was on a group of the family of plants named by Jussieu Apocyneæ, which he succeeded in establishing as a separate family under the title already given them by Jussieu of Asclepiadeæ. In 1810 he published the first volume of the great work he had been preparing on the plants of New Holland, entitling it Prodromus Floræ Novæ Hollandiæ et Insulæ Van Diemen. No second volume of it ever appeared. He was the first English writer on botany who adopted the natural system of classification, which has since generally superseded that of Linnæus, and it was carried out by him in a masterly manner. In 1814 he published a botanical appendix to Captain Flinder's account of his voyage, entitled General Remarks, Geographical and Systematical, on the Botany of Terra Australis. In 1828 he published A Brief Account of Microscopical Observations on the Particles contained in the Pollen of Plants, and on the General Existence of Active Molecules in Organic and Inorganic Bodies. He was the first to call attention to the presence of these active molecules. The movement of the granules of the fovilla (or semi-fluid matter contained in the pollen grains) which he believed to be purely physical, or non-organic, has on the Continent acquired the name of the Brownian or Brunonian movement. He also wrote botanical appendixes for the voyages of Ross and Parry, the African exploration of Denham and Clapperton and others, and described, with Dr. Bennet, the plants collected by Dr. Horsfield in Java. In 1810 he received the charge of the collections and library of Sir Joseph Banks, which were afterwards bequeathed to him for life. He transferred them in 1827 to the British Museum, and was appointed keeper of botany in that institution. He became a fellow of the Royal Society in 1811, D.C.L. Oxford in 1832, a foreign associate of the French Academy of Sciences in 1833. He had the Copley medal in 1839, and was appointed president of the Linnæan Society in 1849. He also received the decoration of the highest Prussian order of civil merit, presided over by Baron Humboldt, who called him *Botanicorum facile princeps*.

As a naturalist Brown occupied the very highest rank among men of science. He powerfully promoted the natural classification of plants, by making the microscope and the study of development the basis of his classification; and by his skill in the application of ascertained facts to the elucidation of obscure and the explanation of doubtful phenomena, he greatly advanced the scientific knowledge of the vegetable kingdom. His influence extended to other observers, and even to other departments of science, so that the researches of Schleiden on the vegetable, and Schwann on the animal cell have been traced to his initiation. His works, contained chiefly in the Transactions of learned societies and other inaccessible forms, are not of a nature to be popular. A collection of them in five volumes is well known in Germany (R. Brown's Vermischte botanische Schriften, Nürnberg, 1825–34, five vols. 8vo); and they have also been printed in England by the Ray Society (1866–67, two vols.)

BROWN, DR. THOMAS, a very eminent metaphysician, was the son of the Rev. Samuel Brown, minister of the parish of Kirkmabreck, in the stewartry of Kirkcudbright, and was born there in 1778. He died at Brompton, near London, April 2, 1820. He was educated at the high school, and subsequently at the University of Edinburgh, where he obtained the professorship of moral philosophy. He distinguished himself, at a very early age, by an acute review of the medical and physiological theories of Dr. Darwin, in a work entitled Observations on Darwin's Zoonomia, 8vo. This work introduced him to a literary society, of which Mackenzie, Jeffrey, and Brougham were members. It was this society which gave rise to the Edinburgh Review. Brown wrote the review of the philosophy of Kant in the second number, but being displeased with some liberties taken with one of his papers intended for the fourth number, his connection with it was terminated. He also published some poems, which displayed considerable talent. His principal poetical work is the Paradise of Coquettes (London, 1814). But he chiefly deserves notice on account of his metaphysical speculations; and his last work, Lectures on the Philosophy of the Human Mind, 1822, affords ample proof of his merit as a profound and original thinker. The system which he developed is characterized by great simplicity. He reduces the intellectual faculties to three great classes—perception, simple suggestion, and relative suggestion; employing the term suggestion as nearly synonymous with association: and thus he stripped the science of mind of that burden of in-

stincts which distinguished the school of Reid and Stewart. His classification of the affections, passions, and duties is perspicuous; and his development of the theory of cause and effect, first suggested by Hume, evinces the extent and ingenuity of his views. Although on some points an opponent of Hume, he leaned, as will be perceived, to the empirical or positivist school of philosophy, to which his lectures have been pronounced to be one of the best introductions.

BROWN COAL, is a mineral nearly resembling coal, and formed like it of vegetable remains, but more woody or fibrous in its formation. It usually belongs to later formations than the common coal, and on this account has been called modern coal. Brown coal is at first hardly to be distinguished from common coal, but it has a brown streak when scratched, and when exposed to the air rapidly deteriorates, falling to powder in a few months, while the kind called lignite tears and splits. Brown coal contains much more water than common coal, and is thus less valuable as fuel. Where better fuel is scarce, however, as in the Austrian dominions, it is largely used. It abounds in the basin of the Danube, and in the neighbourhood of the Eastern Alps and Carpathians. It is also frequently found in Scotland, as at Boghead near Bathgate; Rocksoles near Airdrie; and Methill, Kirkness and Wemyss in Fife. It belongs for the most part to the tertiary period, but is found in earlier deposits.

BROWNE, SIMON, a learned and ingenious Dissenting divine, remarkable for an extraordinary species of mental derangement, was born in 1680; died 1732. He preached for some time at Portsmouth, afterwards at the Old Jewry, one of the principal congregations of Dissenters in London. Here he published a volume of hymns and one of sermons. In 1723 the loss of his wife and only son threw him into a settled melancholy, attended with the persuasion that God had annihilated in him the thinking substance, and utterly divested him of consciousness; and that although he retained the human shape, and the faculty of speaking in a manner that appeared to others rational, he had all the while no more notion of what he said than a parrot. He therefore thought himself no longer a moral agent, or a subject of reward or punishment, and, desisting from his functions, could not be prevailed upon to join in any act of worship, public or private. Notwithstanding this alienation of mind, his faculties in other respects were in full vigour, which he proved by various publications, including the compilation of a dictionary. This, he observed, 'was nothing that required a reasonable soul.' Discourses, two vols. 8vo, 1722.

BROWNE, SIR THOMAS, a physician and very celebrated writer, was the son of a merchant of London, where he was born in 1605; died in October, 1682. He lost his father early, and was defrauded by one of his guardians; but his mother, who married Sir Thomas Dutton, had him educated at Winchester School, whence he was at a proper time removed to Oxford, where he took the degree of M.A. He practised as a physician for some time in Oxfordshire. He subsequently accompanied his father-in-law to Ireland, and afterwards visiting the Continent, received the degree of M.D. at Leyden. On his return to England he settled as a physician at Norwich, where he married and acquired extensive practice and reputation. In 1642 he published his famous work entitled Religio Medici, which excited the attention of the learned not only in England, but throughout Europe, and was translated into various languages. In 1646 his literary character was still further exalted by the appearance of his Pseudodoxia Epidemica, or Treatise on Vulgar Errors, a work of extraordinary learning, and accounted the most solid and useful of his literary labours. Owing probably to his extent of practice, it was not until 1658 that his Hydriotaphia, or Treatise on Urn-Burial appeared, conjointly with his Garden of Cyrus. These works ranked him very high as an antiquary; and he maintained a wide correspondence with the learned both at home and abroad. In 1665 he was constituted an honorary member of the College of Physicians, and in 1671 King Charles II., visiting Norwich, conferred on him the honour of knighthood with great marks of esteem. Of a most amiable private character, he was singularly happy in the affection of his large family and numerous friends; and passed through a remarkably tranquil and prosperous literary and professional life. The literary character of Sir Thomas Browne, as exhibited by his productions, was very remarkable. His Religio Medici is in no way professional, but may be described as the beliefs of an individual, upon morals, religion, and metaphysics. It is a curious production, and its extreme orthodoxy and submission to authority might in later days, at least in expression, be held ironical. He deems it 'no vulgar part of faith to believe a thing, not only above, but contrary to reason, even against the arguments of our proper senses.' Fancy and feeling in fact predominated in him over judgment; he believed in the existence of guardian angels, in the reality of witchcraft, and the appearance of spectres. He was, however, extremely benevolent, opposed to persecution, and in the moral part of his work he frequently expatiates with a noble glow of language on subjects of charity and philanthropy. This work was much attacked, both at home and abroad, especially by the German divines, who, *more theologico*, treated a writer as an atheist and an infidel whose piety and reverence for authority were displayed in every page. The Treatise on Vulgar Errors ably discusses the varying causes of error, which he examines with great strength of reasoning and liberality of sentiment. His appropriation of one grand source of error to the machinations of Satan, however, may not appear very philosophical at present; and of course his own science being only that of the day, he is often astray in the department of natural knowledge. Still he displays a large and penetrating understanding on many points, and this work still retains considerable celebrity. His treatise on Urn-Burial, composed on occasion of the discovery of some funeral urns in Norfolk, discovers some curious erudition on the subject of ancient and modern burial; and the tract called The Garden of Cyrus is still more curiously learned and fantastical. Sir Thomas Browne left some posthumous papers relative to antiquities, which appear in the folio edition of his works, published in 1686. Dr. Johnson, who has written his life, and who is thought in some degree to have founded his own style upon that of Sir Thomas Browne's, has given a masterly description of his genius and tone of composition; in which he speaks highly of the exuberance of his knowledge and plenitude of his ideas; and in reference to his heterogeneous mixture of languages, observes that he who has uncommon sentiments to deliver, may be allowed great liberty in his manner of expressing them. Coleridge has characterized Browne as 'rich in various knowledge, exuberant in conceptions and conceits, contemplative, imaginative; often truly great and magnificent in his style and diction, though doubtless too often big, stiff, and hyperlatinistic.' His works have been republished in three vols. in Bohn's Antiquarian Library.

BROWNE, ULYSSES MAXIMILIAN, COUNT VON, one of the best generals of his time, was born at Basel in 1705; died June, 1757. His father was an Irishman who became colonel in the Austrian service.

The son served from his early youth in the imperial army; distinguished himself in the Italian war, particularly in the battles of Parma and Guastalla; in 1739 was made lieutenant-field-marshal, took the command against Frederick II. in Silesia in 1740, and was defeated at Mollwitz in the following year. In 1746 he gained the battle of Piacenza against the French, took the Pass of Bochetta, and made himself master of Savona. In 1752 he was made governor of Prague, and commander-in-chief of the forces in Bohemia, and in 1756 was appointed field-marshal. He defeated Frederick II. at Lowositz in 1756, and was wounded at Prague, where he served under Prince Charles of Lorraine, on 6th May, 1757. Frederick II. called him his master. His abilities were latterly obscured by his being placed under the command of Prince Charles, who was inferior to him in military skill, and often neglected his counsels.

BROWNE, WILLIAM, an English poet of considerable merit, was born at Tavistock in Devonshire in 1590; died about 1645. He was educated at Exeter College, Oxford, and thence removed to the Inner Temple, London. It does not, however, appear that he devoted himself to the profession, but like many other nominal law students, chose more agreeable studies. In his twenty-third year he published his Britannia's Pastorals, which met with great approbation; and in the following year appeared his Shepherd's Pipe, in seven eclogues. In 1616 he published the second part of his Britannia's Pastorals, which met with equal success with the former. In 1624 he returned to Exeter College, and became tutor to Robert Dormer, earl of Caernarvon, who was killed at the battle of Newbury. At Oxford Browne was created M.A., but upon again quitting the university he was taken into the family of William, earl of Pembroke. An edition of his works in three vols. was printed by Davies in 1772. The versification of Browne is exceedingly harmonious; his expression pathetically simple and natural, although by no means free from the strained thoughts and conceptions which disfigured the allegorical pastorals, and indeed most of the poetry, of his day.

BROWNE, WILLIAM G., an ingenious and enterprising English traveller, in the N. of Africa and the south-eastern part of Asia; born in London 1768; assassinated 1813. He embarked for Africa in December, 1791, visited the kingdoms of Darfur and Bornou in the interior, and was the first who made those countries known to Europeans. Returning to England he published in 1799 Travels in Africa, Egypt, and Assyria, from 1792 to 1798, 4to. He subsequently went again to Asia, and in a journey through Persia lost his life under circumstances of mystery, which have never been properly elucidated.

BROWNIE, in the popular superstitions of Scotland, was a spirit who cleaned the house, churned, threshed, and did other good-natured offices. He seems to be the same as the English puck, hobgoblin, or Robin Goodfellow, whom Reginald Scott (Discovery of Witchcraft) describes as one who, for his pains in grinding malt and mustard, and sweeping the house, had a bowl of milk set for him. When Johnson visited the Hebrides, nothing had been heard of the brownie for many years.

BROWNING, ELIZABETH BARRETT, a distinguished female poet, regarded by some as the greatest which England has ever produced, was born in London in 1809. Her father, Mr. Barrett, was a country gentleman who resided at the foot of the Malvern Hills, and in this beautiful retreat his daughter's girlhood was passed. Her bodily frame was from the first extremely delicate, but her mind was sound and vigorous, and disciplined by a course of severe and exalted study. She early began to commit her thoughts to writing, and in 1826 a volume, entitled An Essay on Mind, with other Poems, appeared of her authorship. Viewed as the production of a young lady of sixteen, this volume is indeed a remarkable one; but in after years its authoress was so dissatisfied with it that she omitted it in the collected editions of her poems. In 1833 appeared a translation by her of the Prometheus Vinctus of Eschylus, and in 1836 the Romaunt of Margret, which was published anonymously in the New Monthly Magazine, and created by its originality a considerable sensation. A collection, entitled The Seraphim, and other Poems, was produced in 1838, the principal piece being a lyric drama shadowing forth the feelings and emotions which may be supposed to have been excited in an angelic being by the spectacle of the crucifixion. Both in this and in a subsequent work, The Drama of Exile (1840), she has chosen for her theme the fall and redemption of man, subjects on which Milton had already employed his genius, and in the treatment of which, though exhibiting much grandeur and sublimity, Mrs. Browning can scarcely be said to have approached our great English poet. Shortly after the publication of The Seraphim, circumstances occurred which interrupted Miss Barrett's progress as an authoress. Always feeble in health, she was now nearly brought to the verge of the grave by the rupture of a blood-vessel, and having been taken to Devonshire to promote her recovery, received there a severe shock by the death by drowning of a favourite brother. For several years she was confined to a darkened chamber, and saw only a few of her most intimate friends, but nevertheless continued to busy herself with study and composition. Her health was at length partially restored, and in 1846 she was married to Mr. Robert Browning, a gentleman well known in the literary world as a poet and dramatist. After their union they went abroad to Italy, and continued subsequently to reside for the most part in the city of Florence. In 1850 a collected edition of Mrs. Browning's works appeared in two volumes, including several new poems, and among others Lady Geraldine's Courtship, one of the finest of her productions, and remarkable, it is said, as having been composed in the incredibly short space of twelve hours. Casa Guidi Windows, a poem on the struggles of the Italians for liberty in 1848–49, appeared in 1851. The longest and most finished of all her works, Aurora Leigh, a narrative and didactic poem in nine books, was published in 1856. Her last volume, Poems before Congress, appeared in 1860, and cannot be said to have added greatly to her reputation. Several detached pieces from her pen appeared from time to time in the Cornhill Magazine up to the period of her death. She expired at Florence on 29th June, 1861. The poetry of Mrs. Browning is characterized by much pathos and depth of feeling, combined with great vividness and powers of description. It partakes eminently of the modern English school, as represented by Tennyson and others, at times obscure and transcendental, but animated throughout by the most noble and exalted sentiments, and illuminated from time to time by flashes which, in their bearings on the unseen world of mind and spirit, seem almost supernatural.

BROWNISTS, the name given for some time to those who were afterwards known in England and Holland under the denomination of Independents, so called from Robert Brown, a notice of whose life is given in a previous page. See INDEPENDENTS.

BRU, MOSES VINCENT, a Spanish painter, born at Valencia in 1682, studied under Juan Conchillos, an able master, and soon outstripped all his fellow-students. When very young he was employed to

execute three paintings for a church of his native town. They are highly praised by Palomino Velusco. The great hopes of future excellence which they raised were disappointed by his premature death in 1703, at the age of twenty-one.

BRUCE, JAMES, a celebrated modern traveller, was born at Kinnaird House, Stirlingshire, in 1730; died in April, 1794. He received his early education at Harrow, whence he removed to the University of Edinburgh, and studied for the law. His precarious health rendered close application dangerous, and it does not appear that he made much progress with his legal studies, but he followed field sports, in which he excelled, with ardour. He left Scotland in 1753 with a view to apply for enrolment in the service of the East India Company as a writer, but falling in with the daughter of a London wine merchant named Allan, he married her, and entered into partnership with her father. A few months after their marriage his wife exhibited symptoms of consumption, and he proposed to remove with her to the S. of France, but she died at Paris in the way. He endeavoured to console himself by the study of languages, particularly Arabic and Ethiopic, and by cultivating his taste for drawing and design, and availed himself of the opportunities of his trade to visit Spain, Portugal, and the Netherlands. His natural tastes now began to develop, and in the course of extensive journeys through Spain he was much interested by the traces of the Moorish occupation, and believing that much light might be thrown on Spanish history by the Arabic manuscripts in the Escurial, he endeavoured, but in vain, to gain access to them. On his return he visited France, where he made some stay, Germany, and the Netherlands. This journey was marked by two uncommon incidents. He fought a duel, and witnessed the battle of Crefeld. In 1758 he inherited his father's estate, the income of which was soon after greatly increased by the establishment of the Carron Iron-works, and the utilization of its coal mines. He consequently relinquished the wine trade in 1761.

During his journey to Spain he had been struck with the defenceless state of Ferrol, and on the breaking out of war he proposed, in an interview with Pitt, a descent on it, for which preparations were actually made by the succeeding government. This project was abandoned, but Lord Halifax, appreciating Bruce's character, proposed to him shortly after a career of geographical discovery, in which he promised him his protection and support. He pointed specially to the exploration of the coast of Barbary, in completion of the labours of Shaw, and hinted also at the discovery of the sources of the Nile. The latter project fired Bruce's ambition, and in the magniloquent language in which he delighted he declared that at that instant his heart suggested to him 'that this great discovery should either be achieved by him, or remain, as it had done for the last two thousand years, a defiance to all travellers, and an opprobrium to geography,' a suggestion which, in the event, has proved slightly erroneous. In the meantime Halifax offered him the consulship of Algiers, which he accepted, and sailed from England in June, 1762, passing through France and Italy, where he spent some months in improving himself in drawing and the study of antiquities. His consulship lasted for two years, and on its expiry in 1765 he visited successively Tunis, Tripoli, Rhodes, Cyprus, Syria, and several parts of Asia Minor, where, accompanied by an able Italian draughtsman, he made drawings of the ruins of Palmyra, Baalbec, and other remains of antiquity, which were sent home and deposited in the king's library at Kew. Having now formed his plan for visiting Abyssinia, he set out for Cairo in June, 1768, after about a year spent in Syria, navigated the Nile to Syene, crossed the desert to the Red Sea, passed some months in Arabia Felix, and reached Gondar, the capital of Abyssinia, in February, 1770. In that country he ingratiated himself with the sovereign and other influential persons of both sexes, in the several capacities of physician, courtier, and soldier. On November 14, 1770, he succeeded in reaching the sources of the Abai, which was then considered the main stream of the Nile. His exultation was extreme, and he records it with singular strength of expression. On his return to Gondar he found the country engaged in a civil war, and was detained two years before he could obtain permission to leave the country. Thirteen months more were occupied in travelling back to Cairo, in which journey he endured excessive privations. In 1773 he embarked at Alexandria for Marseilles, and remained for some time in France, where Buffon and other distinguished men received him with marked attention. After visiting Italy, he returned to Scotland in 1774, and in 1776 married Mary, daughter of Thomas Dundas of Fingask, by whom he had two sons and one daughter. She died in 1785. His long-expected travels did not appear until 1790, in five large quarto volumes, decorated with plates. These volumes are replete with curious information concerning a part of the world but little known to Europeans, and contain much interesting personal adventure, and fine description. The authority of the work, in regard to facts of natural history and human manners, was questioned on its first appearance; but after making deductions for undoubted errors, a valuable mass of information remains, which has been confirmed by all succeeding travellers who have come near or touched upon his track—namely, Salt, Coffin, Pearce, Burckhardt, Belzoni, Combes, Tamisier, De Laborde, and others. Bruce, during the few remaining years of his life, felt keenly the incredulity of the public. This enterprising traveller lost his life in consequence of an accidental fall down stairs, as he was attending the departure of some guests whom he had been entertaining.

BRUCE, MICHAEL, a British poet of the last century, distinguished for the plaintive elegance of his compositions. He was born at Kinnesswood, in Kinross-shire, Scotland, in 1746; and, his friends being persons in low circumstances, he had to struggle with poverty, which, together with constitutional disease, gave a melancholy turn to his mind, and influenced the character of his writings. For a short time he was engaged in the occupation of a village schoolmaster, the fatigues of which probably shortened his life. He became consumptive, and died in 1767. His poems, which are few in number, were published by the Rev. John Logan, together with some of his own, at Edinburgh, in 1770. One, composed in anticipation of his own death, is peculiarly affecting.

BRUCE, ROBERT (ROBERT DE BRUS), fifth lord of Annandale, born 1210; died at Lochmaben Castle, 1295. He was possessed of extensive estates in Cumberland, for which he did homage to Henry III., and in 1255 he was made sheriff of Cumberland. He was appointed one of the fifteen regents of the kingdom of Scotland during the minority of Alexander III. He commanded, along with Comyn and Baliol, the Scottish auxiliaries of Henry III. at the battle of Lewes (1264), where he was taken prisoner, and released in 1265. He was one of the competitors for the Scottish crown on the death of Margaret, the maiden of Norway, in 1290, being the grandson of David, earl of Huntingdon, by his second daughter Isobel, while Baliol claimed as the great-grandson of

the eldest daughter Margaret. On the decision of Edward being given in 1292 in favour of Baliol, Bruce resigned the estate of Annandale to his eldest son to avoid doing homage to him.

BRUCE, Robert de, Earl of Carrick, eldest son of the preceding, accompanied Edward I. to Palestine in 1269; married on his return, in 1271, Martha Margaret, countess of Carrick. Like his father he resigned the lordship of Annandale to his eldest son to avoid acknowledging the supremacy of Baliol. When the latter renounced the authority of Edward, he fought on the side of the English, and after the battle of Dunbar he made application to Edward, unsuccessfully, for the crown.

BRUCE, Robert, the most heroic as well as the most patriotic monarch whom Scotland ever produced, was born on the 21st of March, 1274. He was the son of the preceding. Seven years of alternate resistance and submission, of wars and truces, had passed, from the battle of Falkirk, when Edward I. returned to London, in 1305, victorious for the third time over Scotland, and delivered by treachery from the dreaded Wallace. In his train, among other Scottish nobles, were Robert Bruce and John Comyn, who, formerly rivals, now combined to deliver themselves from the perfidious Edward. They agreed that Bruce should be declared king, and that Scotland should be summoned to arms. Comyn betrayed his accomplice, who, without being informed of the discovery of the plot, was ordered not to leave the court. He received the first intimation of his danger by the present of a pair of spurs and a purse of gold from one of his friends; and understanding the hint, he had his horses shod with their shoes inverted, that the traces on the snow might baffle his pursuers, and escaped to Scotland. He immediately assembled his friends at Dumfries, and all the nobles, except Comyn, encouraged his resolution, and promised their aid. Comyn endeavoured to dissuade them from so desperate an undertaking; and after the assembly was dismissed, he was attacked by Bruce in the cloisters of the Gray Friars, and run through the body. Bruce was soon after crowned at Scone. Being twice defeated, he dismissed his troops, and retired to the Hebrides, accompanied only by two friends. His wife was carried captive to London, three of his brothers were slain, and he himself was supposed to be dead, when he reappeared in Scotland, collected an army, put to the sword the English garrisons, and rallied all Scotland under his banners. Edward set out to subdue the Scots, and was on the point of entering the kingdom, vowing revenge, and secure of success, when he sickened and died, enjoining it with his last breath on his successor never to desist till he had subjected all Scotland. Bruce defeated the English at Bannockburn, near Stirling, and secured the independence of his crown, June 24, 1314. The distracted state of the country required vigorous measures. The Scottish nobles had encroached on the possessions of the king and the commons. The king called upon them to show the titles by which they held their lands. 'By these,' they exclaimed, drawing their swords, 'we have acquired our lands, and with these we will preserve them!' King Robert was once more obliged to defend his territories from the English, who, encouraged by these disputes, had again passed the Scottish borders. The English king, being compelled to retire, was defeated by Bruce near Byland Abbey, Yorkshire (1323). On the accession of Edward III., 1327, hostilities were recommenced, but the Scots were again victorious, and a treaty was concluded at Northampton, March 4, 1328, which recognized the independence of Scotland. Bruce died in the course of the same year. Under the article Scotland a more extended view will be taken of the transactions of this heroic prince, as they all belong to the most memorable and glorious period of Scottish history.

BRUCHSAL, a town of Baden, on both sides of the Salzbach, 12 miles N.N.E. from Carlsruhe, and on the railway between it and Heidelberg. It is walled, and has spacious barracks. It is an ancient town, was the residence of the prince-bishops of Spires from A.D. 1024, whose antique castle is still standing, and is the seat of the judicial administration of the bailiwick. The Grand-duke of Baden, who acquired it in 1803, has a fine palace and grounds here. In the environs are the salt-springs of Ubstadt. Pop. in 1871, 9786.

BRUCINE, an alkaloid discovered in 1819, and obtained in the preparation of strychnine, from which it is separated by boiling alcohol. It crystallizes in white and transparent prisms, with a rhomboidal base. It has a very bitter taste, but no smell, and is less poisonous than strychnine. It is insoluble in ether, and dissolves in a mixture of 850 parts of cold and 500 parts of boiling water. Nitric acid gives it a scarlet, and sulphuric acid a rosy tint, but both turn gradually to yellow. A solution of copper turns it to violet. These reactions distinguish brucine both from strychnine and morphine. The salts of brucine are tolerably numerous, and are prepared by double decomposition, or by direct combination of the brucine with the acid. They are for the most part crystallizable, and like the base have a bitter taste. They are not used in medicine.

BRUCIOLI, or Bruccioli, Antonio, born at Florence in the end of the fifteenth century, early displayed great talent, and was one of the learned Florentines who used to meet in the fine gardens of Bernard Rucellai. In 1522, having become implicated in a conspiracy against Giuglio di Medici, who then governed Florence in the name of Leo X., he took refuge in France, where he became acquainted with the doctrines of the reformers, and probably embraced them. On the expulsion of the Medici in 1527 he returned to Florence, but, by his free declamation against monks and clergy, brought his orthodoxy in question, and was imprisoned on several charges, among which that of heresy was included. He would have been executed but for the interference of powerful friends, who obtained a commutation of his sentence into banishment for two years. He retired to Venice with two brothers, who were printers, and availed himself of their press to publish a great number of works, of which the most celebrated is a translation of the Bible into Tuscan. The first edition appeared in folio in 1532, and was dedicated to King Francis I., who is said to have taken no notice of it. The boldness of his annotations caused it to be ranked as a heretical work. He afterwards published it with a larger commentary, in three vols. folio (Venice, 1546–48). This edition is now very scarce. It is said to contain many inaccuracies; and though professedly made from the original Hebrew and Greek, appears to be taken, for the greater part, from the Latin version of Pagnini. Brucioli was living in 1554, but the exact date of his death is not known. The number of his volumes is said to have exceeded that of his years. Among his works are Italian translations of Pliny, Aristotle, and Cicero, and annotated editions of Petrarca and Boccacio.

BRUCKER, John James, distinguished for his learning, was born at Augsburg in 1696, studied at Jena, and after occupying several subordinate situations, was appointed minister in his native town. His attention had been early directed to the history of philosophy, and he gradually accumulated the materials of the great work on which his fame now rests. It is entitled Historia Critica Philosophiæ, a Mundi Incunabulis ad Nostram usque Ætatem Deducta, and

was first published in 1744, in five vols. 4to, which were afterwards augmented by a supplementary sixth volume. It is remarkable for the extent and accuracy of its erudition, and the minute fidelity with which the opinions of the philosophers are detailed. It has been republished at Leipzig, with important additions by Born. Brucker wrote several other large and valuable works, almost all in the department of historical literature, and died at Augsburg in 1770.

BRUEIS, or BRUYS, a French admiral, born of an ancient noble family of Uzés, entered the navy at a very early age, and gradually rose in the service. In 1798 he was employed to convey Bonaparte and his army, which were to effect the conquest of Egypt and the East, and having managed to elude the vigilance of Nelson, who had been long watching for him, reached the Bay of Aboukir, and disembarked the troops in safety. Brueis moored his fleet in a position naturally so strong that he deemed it impregnable; but he was mistaken, and by the heroic daring of Nelson, found the precautions which he had taken turned to his disadvantage. In the battle which ensued, he fell fighting boldly, a little before his ship, the *Orient*, of 100 guns, blew up.

BRUGES (Flemish, *Brugge;* that is, Bridges), a city of Belgium, capital of West Flanders, situated about 57 miles N.W. Brussels, on the railway to Ostend. It is the centre of an extensive canal commerce. Bruges has over fifty bridges, all opening in the middle for the passage of vessels. It is surrounded by walls with seven gates. The principal canals are those which lead to Sluis, Ghent, and Ostend, on all of which pretty large vessels can come up to Bruges. In the fourteenth century it was one of the chief commercial places in Europe, and an important member of the Hanseatic Confederacy. Towards the end of the fifteenth century it began to decline. It now carries on a considerable trade with the north of Europe. The pop. is (1869) 47,621. The Halles (containing cloth and other halls or markets) is a fine old building, with a tower 354 feet high, in which is a numerous set of chimes. Bruges has also a chamber of commerce and a dock-yard; likewise a royal gymnasium, an academy of painting, sculpture, and architecture; a national literary society, &c., and many valuable specimens of architecture and sculpture. In the Church of Nôtre Dame, with its elevated spire, are the splendid tombs of Charles the Bold and of Mary of Burgundy, his daughter, constructed in 1550. Philip the Good here founded the order of the Golden Fleece in 1430; and the celebrated Jan Van Eyck, or John of Bruges, the supposed inventor of painting in oil, was born here. Bruges was fortified by Count Baldwin in 837, walled first in 1053, and again in 1270. It was thrice burned, and lost its records by fire in 1280. In the thirteenth century it ranked as the central mart of middle North Europe. It was nearly ruined by the oppression of the Duke of Alva. The remains of ancient buildings, abandoned monasteries, and streets half deserted from the diminished population of the modern city, give Bruges an antiquated and venerable appearance. The houses are very old, and in a state of excellent preservation. Bruges is still, by means of its canals, an entrepot of Belgian commerce. The chief articles manufactured at Bruges are lace, linen, damasks, light woollen goods, cottons, mixed stuffs, &c. It exports agricultural produce and manufactured goods, and imports wine, oil, drugs, spices, dried fruits, dye-woods, &c.

BRUGMANS, SEBALD JUSTINUS, a learned Dutchman, physician-in-chief of the army, of the marine, and of the colonies; member of the Institute of the Netherlands, and of many learned societies. He was born at Franeker in 1763, and graduated in 1781 at Groningen. His dissertations, Lithologia Groningiana; on Hurtful and Poisonous Plants in Pastures; on the Symptoms of Decay in Trees; and De Puogenia, in 1785, procured him distinction. He became professor of philosophy and physics in Franeker, where he formed a cabinet of comparative anatomy, one of the first in Europe. He became professor of botany at Leyden in 1786, and of chemistry in 1795. His labours for the organization of the medical department of the army commenced in 1794. He was an active contributor to the Pharmacopœia Batava. King Louis made him his physician, and confirmed all his institutions. After the union of Holland with France, Napoleon made him inspector-general of the hospitals, and rector of the University of Leyden, for which he procured large sums of money from the state, and in later times the return of its collection of natural history from Paris. During the many years he was director of the military hospital, the number of deaths by wounds and diseases was never increased by hospital fevers. After the battle of Waterloo he promptly procured medical aid for more than 20,000 wounded men. His treatise on the Nature of the Miasma of Hospital Fever gained the prize of the Academy in Haarlem. His original views on the organization of fishes are to be found in the Transactions of the National Institute of the Netherlands. He died in 1819.

BRÜHL, HANS MORITZ VON, nephew of the minister, born 1746; died 1811. He is known by his ingenious improvements of several instruments, by his essays in the Philosophical Transactions, and by his Recherches sur divers Objets de l'Économie Politique (Dresden, 1781).

BRÜHL, HEINRICH, COUNT VON, minister and favourite of Frederick Augustus II. (otherwise called Augustus III.), king of Poland and elector of Saxony, was born in 1700 in Thuringia, and entered as a page the service of the Duchess Elizabeth, whose favour as well as that of Frederick Augustus I. he gained by his lively and graceful manners. On the death of the king at Warsaw in 1733, the crown of Poland with the other regalia being, through the good fortune of Brühl, intrusted to him, he carried them immediately to the new elector, Augustus III., and showed the greatest activity in promoting his election. From this time fortune never deserted him. He had cunning and skill sufficient to govern his master and get rid of his rivals. While he felt himself not sufficiently powerful to remove his rival, Count Sulkowski, he acted as his friend; but after his marriage with the Countess Kollowrath, the favourite of the queen, he effected the dismissal of Sulkowski through her influence. He now succeeded in keeping everybody at a distance from the king. No servant entered his service without the consent of Brühl, and even when he went to the chapel all approach to him was prevented. The monarch's wish that his minister should make a great parade was gratified in its widest extent. Brühl kept 200 domestics; his guards were better paid than those of the king himself, and his table more sumptuous. Frederick II. says of him, 'Brühl had more garments, watches, laces, boots, shoes, and slippers, than any man of the age. Cæsar would have counted him among those curled and perfumed heads which he did not fear;' but Augustus III. was no Cæsar. When this idle prince loitered about smoking, and asked, without looking at his favourite, 'Brühl, have I any money?' 'Yes, sire,' was the continual answer; and to satisfy the king's demands he exhausted the state, plunged the country into debts, and greatly reduced the army. At the beginning of the Seven Years' war it comprised but 17,000 men, and these were compelled to surrender at Pirna from want of the necessary supplies. Brühl fled with the king, the

pictures, and the china, to Poland; but the archives of the state were left to the victor. He was no less avaricious of titles and money than of power. He died a few weeks after his king in 1763. An examination after his death showed that he owed his immense fortune to the prodigality of the king rather than to unlawful means of accumulation. His own profusion was often beneficial to the arts and sciences.

BRUMAIRE, THE 18TH, of the year VIII. in the calendar of the French revolution (Nov. 9, 1799). On this day General Bonaparte overthrew the Directory. The next day he dispersed at the point of the bayonet the Council of Five Hundred, and was elected consul.

BRUMMEL, GEORGE BRYAN, generally known by the sobriquet of *Beau Brummel*, was the son of a clerk in the treasury, and born in London in 1778. He was educated at Eton, and subsequently at Oxford, at both of which places he acquired great distinction by his taste in dress, which afterwards made him the autocrat in the world of fashion. At the age of sixteen he casually made the acquaintance of the Prince of Wales, afterwards George IV., who conceived a wonderful fancy for him, and made him a cornet in his own regiment of the 10th Huzzars. Brummel was now introduced into the most aristocratic society in England, and through the favour of the prince had rapid promotion in the army, though his carelessness was such that he often did not know his own troop. The death of his father in 1794 put him in possession of a fortune of £30,000, which he expended in a course of sumptuous living, extending over a period of twenty-one years, during which his *dicta* on matters of etiquette and dress, and more especially the latter, were received in the *beau monde* as indisputable. He kept a magnificent bachelor establishment at the west end, gave splendid dinners, and basked in all the sunshine that youth, money, and princely favour could bestow. But these golden days must come to an end. The fickle temper of the prince-regent at last got tired of Brummel, and an estrangement took place. A well-known story is told in connection with this rupture, that Brummel, having called out at Carlton House, 'Wales! ring the bell,' the prince complied, and on the servant making his appearance, said, 'Order Mr. Brummel's carriage.' This story was always denied by Brummel. The beau's creditors, too, now began to be clamorous, and in 1814 he made a hasty journey to Dover, and crossed the Channel to Calais, where he resided for many years, partly supported by the remains of his own fortune and partly by remittances from friends in England. In 1824, when George IV. passed through Calais on his way to Hanover, Brummel ventured again to address himself to him, but was unceremoniously repulsed. Subsequently to this, he was appointed consul at Caen, but after holding this office for a few years, it was abolished as unnecessary, and he was reduced to absolute poverty. His mind, too, latterly gave way, and he died miserably in a lunatic asylum at Caen on 29th March, 1840.

BRUN, or BRUNN, MALTE-CONRAD, generally known by the name of *Malte-Brun*, a celebrated geographer, was a native of Denmark, and born at Thisted, in the province of Jutland, on the 12th of August, 1775. His father, who held an important office under government, intended him for the church, but the imaginative temperament of his son ill accorded with such a destiny. While yet a very young man he produced some poems which gave great promise of his rising to eminence in the domain of the Muses. About this time, however, the French revolution called forth a host of ardent champions of the cause of progress throughout Europe, and the young poet embraced it with enthusiasm. He abandoned the church for the bar, and subsequently became the editor successively of two journals, in which his advocacy of liberal principles provoked a state prosecution that compelled him to take refuge in the Swedish island of Hven, once the residence of Tycho Brahe. From this he shortly afterwards received permission to return to Copenhagen; but some fresh attacks on government again made him an exile from his country, and he retired first to Sweden and then to Hamburg, where a wealthy merchant intrusted him with the education of his children. Not long after, his admiration of Napoleon Bonaparte, then rapidly advancing to the head of affairs, prompted him to take up his abode in France; but the elevation of his idol to the post of consul for life opened Brun's eyes to his ambitious designs. He had the courage openly to blame the weakness of the senate in yielding to them, and for the time withdrew from the pursuit of politics. A new sphere of study now engaged his attention, which was henceforth directed to the science of geography. In 1803 he published, along with Mentelle and Herbin, the commencement of Géographie Mathématique, Physique et Politique, de toutes les Parties du Monde, a work which was completed in sixteen volumes in 1807, and in the composition of which Brun's share amounted to about a third. Before the completion of this work his reputation as a writer, resting on his vivid description of the northern countries with which he was familiar; on his style, which was equal to that of the most eloquent French writers; and on the introduction of a new method of treating geography, which in the hands of previous French geographers had been a mere compilation of dry details, had been firmly established, and in 1806 he received an appointment on the staff of the Journal des Débats, for which he continued to write articles on foreign politics until his death. In 1808 appeared his Tableau de la Pologne, and the same year he joined M. Eyriès in starting the Annales des Voyages, de la Géographie et de l'Histoire, which proved the introduction in France of regular periodical geographical literature. In 1810 was published the first volume of his Précis de la Géographie Universelle, completed in eight volumes in 1829, and re-issued in twelve volumes in 1831. During the Hundred Days Brun adhered to the legitimist cause, and published an Apologie de Louis XVIII. Towards the end of 1821 he lent powerful assistance in establishing the Société de Géographie. His health, however, had long been declining from his intense and unintermitting labours, and on the 14th December, 1826, he breathed his last. Besides the works already mentioned, he was the author of various geographical and political treatises too numerous to particularize.

BRUNCK, RICHARD FRANZ PHILIPP, one of the most ingenious critics of modern times, was born at Strasburg in 1729, and made rapid progress in learning when he studied with the Jesuits in Paris, but neglected study as soon as he entered into active life. While in winter-quarters at Giessen, as commissary of war during the French campaigns, he resided with a professor who, by his advice and example, revived his love of letters, and led him to the study of the classics. When Brunck returned to Strasburg he devoted all his leisure time to Greek, and at the age of thirty years, and while holding a public office, attended the lectures of the Greek professor of the university. The zeal which had encouraged him to undertake this laborious study was increased by the pleasure of overcoming difficulties, and he became fixed in the conviction that all the instances of apparently careless writing in the Greek poets were only errors of the transcribers. Entertaining this opinion, he altered whatever displeased

him, overthrew the order of the verses, and permitted himself liberties which criticism must needs reject. To this rage of altering he gave himself up, particularly in the marginal comments of his books, and in the numerous copies which he made of the Greek poets, more for his own pleasure than for use. This arbitrary process is so visible, even in the editions he has published, that much caution is required in using them. Brunck has nevertheless been of essential service to Greek literature, and since the revival of letters few scholars have so effectually promoted it. It is wonderful how much he has done in the space of twenty years. He published a valuable edition of Virgil. Of his Greek editions we may mention those of the Analecta, Apollonius Rhodius, Aristophanes, the Gnomic poets, and his masterpiece Sophocles, for which the king allowed him a pension of 2000 francs. At this time the French revolution interrupted his studies. He adopted the new ideas with enthusiasm, and was one of the first members of the popular society in Strasburg, without deviating, however, from the principles of moderation. This is proved by the circumstance that he was arrested at Besançon during the Reign of Terror, and did not obtain his liberty until after the death of Robespierre. In 1791 economical reasons obliged him to sell part of his library, and in 1801 he was obliged to adopt the same resource a second time. As he was passionately fond of his books, and his former fortune had enabled him to collect an excellent library, this was a severe privation. If he was reminded of an author he had once possessed tears came into his eyes. From this time Greek became his aversion; but he prepared an edition of Terence, and had Plautus ready for publication when he died in 1803. Many of the papers which he left are in the library at Paris.

BRUNDUSIUM. See BRINDISI.

BRUNE, GUILLAUME MARIE ANNE, Marshal of France, son of a lawyer at Brives la Gaillarde, was born there March 13, 1763, and went while young to Paris to study law. At the breaking out of the revolution he was a printer, and had made himself known by some small pieces of his own composition. He now devoted himself ardently to politics, became a member of the club *des Cordeliers*, was connected with Danton, and played an active part in the tempests of that period. Till August 10, 1792, he was engaged in publishing a daily newspaper. Afterwards he went as civil commissary to Belgium. In 1793 he entered the military service in the revolutionary army in the Gironde. October 10, 1795, he aided Barras to put down the Jacobins, who had assaulted the camp of Grenelle. Afterwards he distinguished himself as general of brigade in the Italian army, in the battle of Arcola, and in the attack on Verona. When the directory of Switzerland declared war Brune received the chief command of an army, entered the country without much opposition in January, 1798, and effected a new organization of the government. In 1799 he received the chief command in Holland, defeated the British in the N. of Holland, September 19, near Bergen, and compelled the Duke of York to agree to the treaty of Alkmaar, October 18, by which the British and Russians were to evacuate the N. of Holland. In January, 1800, he was made a councillor of state, and was placed at the head of the army of the west, in occupation of La Vendée, and contributed greatly to the re-establishment of tranquillity in the revolted province. Aug. 13 he was appointed commander-in-chief of the Italian army. Towards the end of Dec. he led his troops over the Mincio, conquered the Austrians, passed the Adige Jan. 8, 1801, took possession of Vicenza and Roveredo, and concluded an armistice, Jan. 16, at Treviso, with the Austrian general Bellegarde, by which several fortified places in Italy were surrendered to the French troops. When peace recalled him to the council of state towards the end of November, 1802, he laid before the legislative body for confirmation the treaty of peace with the court of Naples. The next year he went as ambassador to the court of Constantinople. He prevailed there at first over the British party, and received from the Turkish ministry the highest marks of honour; but when new dissensions arose between the two powers he left Turkey. During his absence, May 19, 1804, he was appointed marshal of the empire. At the end of 1806 Napoleon appointed him governor-general of the Hanseatic towns, and soon after commander of the troops in Swedish Pomerania, against the King of Sweden. This monarch invited the marshal to a personal interview, in which he endeavoured to convert him to the cause of Louis XVIII. Brune refused every proposal. He may, however, have drawn upon himself the indignation of Napoleon by his conduct in this interview, or by favouring the British contraband trade in Hamburg. At any rate he was recalled, and suffered to remain without employment. After the revolution of 1814 he acknowledged Louis XVIII., and received the cross of Louis, but no appointment. This was the cause of his declaring himself for Napoleon immediately upon his return. He received the chief command of an important army in the S. of France, and was made a peer. When circumstances changed again he delayed a long time before he gave up Toulon, which was in his possession in 1815, to the troops of Louis XVIII., and sent in his resignation to the king. This circumstance, and the severities exercised by his command, might well have excited against him the rage of the people. While retiring from Toulon to Paris he was recognized at Avignon by the people who favoured the king, and they immediately collected together about the hotel which he had entered. The excited populace were roused still more when a report was spread among them that Brune was the murderer of the Princess Lamballe. The marshal was permitted, however, to go away quietly. But scarcely had his carriage left the city before a mob of the rabble which had followed compelled the driver to turn back to the hotel. When the marshal had alighted, and retired with his two adjutants to his former chamber, the doors of the house were locked. The insurgents had, in the meantime, gained a powerful accession to their numbers, and with loud shouts demanded the death of the marshal. In vain did the prefect and the mayor strive to defend him (as there were no troops in the city) for the space of four hours and a half, at the peril of their lives. The door was at last broken open, a crowd of murderers rushed into the chamber, and the unhappy marshal fell under a shower of balls, after a fruitless attempt to defend himself and justify his conduct. His body was exposed to the most shameful insults, and then dragged from the hotel to the bridge over the Rhone, from which it was thrown into the river.

BRUNEHILDE, married to Siegebert I., king of Austrasia, in 568, a Visigothic princess, of powerful mind, enterprising spirit, heroic resolution, deep political knowledge, and unrestrained ambition. She involved her husband in a war with his brother Chilperic, in the course of which he was murdered, A.D. 575; but she continued to live and reign till 613, when she fell into the hands of Clothaire II., king of Soissons, who put her to a most terrible death, as having been the murderess of ten kings and royal princes. See FREDEGONDE.

BRUNEL, ISAMBARD KINGDOM, son of the eminent engineer Sir Mark Isambard Brunel, and him-

self distinguished in the same profession, was born in 1806 at Portsmouth, where his father was then residing. He was educated in France at the Henri IV. College at Caen. Like his father, the bent of his genius was to mechanical pursuits, and at the age of twenty he commenced practical engineering under him at the Thames Tunnel, for which he acted as resident engineer. During the progress of the works he was more than once in imminent danger of his life by the breaking in of the river, and only saved himself by swimming. His attention was mainly directed to steam navigation and railway engineering, and of his works in these departments may be mentioned, among others, the *Great Western*, *Great Britain*, and *Great Eastern* steamships; the entire works on the Great Western Railway, to which he was appointed engineer in 1833; and the railway viaduct over the Tamar at Saltash. He was also the engineer of the Hungerford Suspension Bridge. The genius of the younger Brunel was undoubted, but in carrying through his operations he was, like his father, too apt to regard merely the attainment of a grand and brilliant result, without taking into consideration the losses and expense which might thereby be occasioned to those who had invested their capital in the undertaking. This was more especially the case with the Great Western Railway. It was remarked, in contrasting him with George Stephenson, that the works of the former never paid, while those of the latter always did. While on board the *Great Eastern*—his last work—the day before she quitted the Thames on her first disastrous cruise, Mr. Brunel was suddenly seized with paralysis, and had to be carried home. In a week afterwards he expired, on the 15th September, 1859. He was a fellow of the Royal Society in 1830, D.C.L. Oxford, 1857.

BRUNEL, Sir Mark Isambard, a distinguished engineer, was the son of a Normandy farmer, and born at Hacqueville, near Rouen, on the 25th April, 1769. He was educated at the seminary of St. Nicaise, in Rouen, and from early boyhood displayed a decided turn for scientific and mechanical pursuits, amusing himself in the construction of ships, musical instruments, and machines of different sorts. At the age of fifteen he went to reside for some time with a friend of his father, a M. Carpentier, of Rouen, where he went through a course of lessons in drawing, perspective, and hydrography. In 1786 he entered the French naval service, and made several voyages to the West Indies, in which he distinguished himself both by his inventive mechanical genius and the attention and ability with which he discharged the duties of a seaman. In 1793 he returned to France; and having paid a visit to Paris, and taken part in the proceedings at one of the political clubs, he narrowly escaped proscription by venturing to oppose the ferocious doctrines then current, and was obliged to make his escape to America. Shortly after his arrival there he joined a party of Frenchmen in an expedition to explore the regions around Lake Ontario, and in 1794 he was appointed one of the surveyors of the canal now connecting Lake Champlain and the river Hudson. He was afterwards employed both as an engineer and an architect on various undertakings in the city of New York, including the erection of forts for its defence, and the establishment of an arsenal and foundry. In 1799 he proceeded to England and settled at Plymouth, where he married Miss Sophia Kingdom, whom he had formerly known at Rouen. His first work in this country was the construction of a copying machine; and he soon established his reputation as a mechanician by the invention of a machine for making the block-pulleys for the rigging of ships, which has effected an immense saving in labour and expense, and is still in full operation in our naval dockyards. Of Brunel's subsequent achievements may be mentioned more especially the erection of the steam saw-mill in Chatham dockyard, a machine for making seamless shoes for the army, machines for making nails and wooden boxes, for ruling paper and twisting cotton into hanks, and lastly, a machine for producing locomotion by means of carbonic acid gas, which, however, though partially successful, was ultimately abandoned. But the great work by which his name will be transmitted to posterity is the Thames Tunnel, which, though almost a complete failure as a commercial speculation, is nevertheless a wondrous monument of engineering skill and enterprise. It was commenced in March, 1825, and opened to the public in 1843, after a multitude of disasters and obstacles had been endured and surmounted. He was elected a fellow of the Royal Society in 1814, and vice-president from 1832–33. In 1841 the honour of knighthood was conferred on him. He died in Dec. 1849, universally respected, as well for his scientific genius as for his amiable temper and benevolence of disposition.

BRUNELLESCHI, Filippo, architect, born 1377 at Florence, devoted himself to the study of the works of Dante, to natural philosophy and perspective, the rules of which were then scarcely known. He formed various figures, and invented ingenious machines. He devoted himself particularly, however, to architecture; and learned the art of drawing to make his architectural plans; statuary, to adorn them; and mechanics, that he might be able to raise the materials. He was also profoundly versed in mathematics and geometry. He is said to have drawn views of the finest monuments in Florence in perspective—an art which then excited much astonishment. This various knowledge prepared him for bold and difficult undertakings, and gained him the name of the restorer of architecture. As a statuary he was much indebted to his intimate connection with Donatello, who was then very young but very able. Both went to Rome. Here Brunelleschi conceived the idea of restoring architecture to the principles of the Greeks and Romans. When the architects assembled in 1407 at Florence to consult upon the building of the dome of the cathedral of Santa Maria, the plan which Brunelleschi proposed received but little attention, and he went back to Rome. It was found necessary, however, to have recourse to him, as the undertaking far surpassed the powers of the other architects. He engaged to erect a dome which, by its own weight and by the strong connection of its parts, should hang suspended. This proposal seemed so wonderful that the author was regarded as insane. As all other plans, however, failed to answer the expectations of the magistrates, Brunelleschi was again recalled, and ordered to explain the mode in which he intended to execute his plan. This he refused to do, but built two small chapels according to his new system. On this the charge of erecting the dome was committed to him. As he observed that the higher the building was raised the more time was lost in going up and down, he erected some small lodgings on the dome itself, and by that means saved the labourers the time thus spent. Aided only by his own genius he accomplished the work, which remains one of the boldest creations of the human mind. But the ingenious lantern, which formed the upper part of the dome, was not finished when he died in 1444, aged sixty-seven. It was completed, however, according to his first design. No monument of ancient architecture is so noble as this wonderful building. Only the dome of St. Peter's at Rome, which was built since, excels it in height.

but is inferior to it in lightness and grandeur of style. Michael Angelo said it was difficult to imitate Brunelleschi, and impossible to excel him. Brunelleschi is the author of a great number of other masterpieces of architecture.

BRUNET, JACQUES CHARLES, bookseller at Paris, born 1780. He began his bibliographical career by the preparation of several auction catalogues, of which the most interesting is that of the Count d'Ourches (Paris, 1811), and of a supplementary volume to Cailleau's and Duclos' Dictionnaire Bibliographique (Paris, 1802). In 1810 was published the first edition of his Manuel du Libraire et de l'Amateur de Livres, in three vols., which gained such universal applause that, in 1814, a second, and in 1820 a third edition, of four volumes each, were demanded. This work showed him the worthy successor of the meritorious Debure (from whose works those of Brunet are distinguished only by the alphabetical form). He died at Paris 14th November, 1867. A sixth edition of his great work appeared between 1860 and 1865 in six volumes, the last containing a Table Méthodique, or classified catalogue, in which the works are arranged according to their subjects.

BRUNI. See BRUNO (LEONARDO).

BRUNINGS, CHRISTIAN, one of the greatest hydraulic architects of Holland, was born in 1736 at Neckerau, in the Palatinate. In his childhood he devoted himself to the sciences connected with hydraulic architecture. In 1769 the States of Holland appointed him general inspector of rivers. This introduced him to a share in several important commissions; for instance, that for the improvement of the dike system in 1796; that for draining the tracts between Niewskogs and Zevenhoven in 1797, &c. His most important waterworks are his improvements in the diking of the lake of Haarlem, the improved diking and deepening of the Oberwasser, so called, in the Netherlands, which at high tides often inundated vast extents of country, together with the change in the course of the Waal-stream and the canal of Pannerde, by which the beds of the Rhine, the Waal, and the Leck were improved. He introduced into his department the use of the *stream measure*, so called. His many official duties prevented this worthy officer from often appearing as an author. Yet we find scientific essays written by him in the fourteenth, nineteenth, and twentieth volumes of the Memoirs of the Haarlem Society of Sciences, and some other pieces. He died in 1805. The Directory of the Republic proposed to erect a monument to him in the cathedral church at Haarlem; but it has never been completed on account of the political disturbances that occurred soon after his death.

BRÜNN, an Austrian city, the capital of Moravia, and of a circle of the same name, on the railway from Vienna to Prague, 70 miles N. by E. of Vienna, nearly encircled by the rivers Schwarza and Zwittawa. The pop. of the city, 31st December, 1869, was 73,464. It contains a cathedral and other handsome churches; a landhaus, where the Estates meet; several splendid palaces, a gymnasium, museum, botanic garden, &c., and has extensive manufactures of silks, cottons, and more especially fine woollens, which have procured for it the name of the Austrian Leeds. It is the centre of the Moravian commerce, a great part of which is carried on by fairs held at Brünn every three months. Near it is the fortress of Spielberg, in which Baron Trenk and Silvio Pellico were confined. Brünn was formerly a free imperial city, an important fortress, and the residence of the margraves of Moravia. It was unsuccessfully besieged by the Taborites in 1428; by Torstenson in 1645; by the Prussians in 1742. It was occupied by the French in 1805, and Napoleon made it his head-quarters after the battle of Austerlitz. It was taken again by a division of the French army in 1809 and dismantled.

BRUNO THE GREAT, Archbishop of Cologne and Duke of Lorraine, third son of Henry the Fowler, and brother of the Emperor Otho I., had a great share in the events of his time, and surpassed all the contemporary bishops in talents and knowledge. A numerous train of learned men from all countries, even from Greece, continually followed him, and his excellent example was imitated by many prelates. He died at Rheims October 11, 965. Commentaries on the five books of Moses, and the biographies of some saints, are ascribed to him.

BRUNO, ST.—1. The apostle of Prussia, died in 1008. He entered the order of St. Benedict, and accompanied St. Adalbert on his mission to Prussia. He was appointed chaplain to the Emperor Henry II., and founded a church at Querfurt. Having been taken by the Pagans of Lithuania, he had his hands and feet cut off, and was afterwards beheaded.—2. The most famous of this name is the one who established the order of Carthusian monks. He was born at Cologne about 1030 of an old and noble family, which still flourished in the middle of the eighteenth century; was educated in the school of the collegiate church of St. Cunibert, in which also he afterwards received a canonship, and then studied at Rheims, where he distinguished himself to such a degree that Gervais, the bishop, appointed him to superintend all the schools of the district. He attracted many distinguished scholars, and among others Odo, afterwards Pope Urban II. Subsequently he was offered the bishopric of Rheims, but the immorality of his times induced him to go into solitude. He repaired with six friends of a like disposition to Hugo, bishop of Grenoble, who himself, in 1084 or 1086, led them to a desert 4 or 5 leagues distant from the city, called *Chartreuse*, whence the order of monks received its name. Here, in a narrow valley overshadowed by two steep rocks and bleak in the extreme, Bruno and his companions built an oratory, and small separate cells to dwell in, and founded one of the severest orders of monks. In the meantime Urban II. became pope, and in 1089 invited his former instructor to his court. Bruno reluctantly obeyed, but refused every spiritual dignity, and in 1094 received permission to found a second Carthusian establishment in the solitude of Della Torre, in Calabria. Here he lived in his former wont, ruled his new colony with wisdom, and died in the arms of his scholars, A.D. 1101. Leo X., by whom he was beatified, in 1514 permitted the Carthusians to celebrate a mass in honour of him; and Gregory XV., who ordered the process of his canonization, in 1623 extended it to the whole Catholic Church. Bruno gave his scholars no particular laws.

BRUNO, GIORDANO, a philosopher of the sixteenth century, distinguished by the originality and poetical boldness of his speculations. He was born at Nola, in the Neapolitan territory, about 1550; entered the order of Dominicans; and took refuge, probably from the persecutions which he drew upon himself by his religious doubts and his satires on the monks, at Geneva in 1580. Here, however, he was soon persecuted by the Calvinists for his paradoxes and his violence. In 1583 he stood forth at Paris as the antagonist of the Aristotelian philosophy, and as teacher of the *ars Lulliana*. His disputes with the Aristotelians caused him to leave Paris, and he then went to London, where he published several of his works, and to Oxford, where he taught for a short time. In 1585 he went by way of Paris and Marburg to Wittenberg, and from 1586 to 1588 taught his philosophy there. Why he left Wittenberg is not known, but it is certain that he went in 1588

to Helmstadt, and he seems to have visited Prague before that year. Protected by Duke Julius of Wolfenbüttel, he remained in Helmstadt till his protector died in 1589. He was then engaged at Frankfort-on-the-Maine with the publication of some works, particularly De Monade Numero et Figura, but left this city also in 1592, and returned (it is not known for what purpose) to Italy. He remained for some time at Padua in tranquillity, until the inquisition of Venice arrested him in 1598, and transferred him to Rome. After an imprisonment of two years, that he might have opportunity to retract his doctrines, he was burned, February 16th, 1600, for apostasy, heresy, and violation of his monastic vows. This death, which he might have averted eight days before by a recantation, he suffered with fortitude. Whilst his violent attacks on the prevailing doctrines of the Aristotelian philosophy, and on the narrow-minded Aristotelians themselves, everywhere created him enemies, his rashness and pride threw him into the hands of his executioners. His philosophical writings, which have become very rare, display a classical cultivation of mind, a deep insight into the spirit of ancient philosophy, wit and satire, as well as a profound knowledge of mathematics and natural philosophy. Most of them were published between 1584 and 1591, as appears from the enumeration of the oldest editions in the Bibliographical Lexicon of Ebert (Lpg. 1821, quarto, vol. i. p. 238, et seq.) In 1585 appeared at Paris his famous Spaccio della Bestia Trionfante (a moral allegory, with many satirical strokes on his own times); also his work Della Causa, Principio ed Uno (Venice and London, 1584); besides Del Infinito, Universo, e Mondi. The former contains the foundation, the latter the application of metaphysics to the natural world. The doctrine is a pure Pantheism, connected with very peculiar notions of God—*Deus est monadum monas, nempe entium entitas*—a more complete Pantheistical system than had been previously exhibited, and which, since his time, Spinoza only, who, like Descartes, borrowed his ideas, has reduced to a more systematic form. The notion that God is the soul of the universe, and the world endowed with organization and life, might have been forgiven by his contemporaries; but his inference, that the world is infinite and immeasurable, and his doctrine of the plurality of worlds, at the moment when the new system of Copernicus was attacked from all quarters, could not but be looked upon as a crime. His writings are mostly in the form of dialogues, without any methodical order. His language is a strange mixture of Italian and Latin. His style is violent and fiery. The originality and loftiness of his ideas take a powerful hold on those who can understand him. His logical writings, in which he boldly and skilfully applies Raymond Lully's art of topical memory, are more obscure and less interesting. His belief in magic and astrology, notwithstanding his enlightened views of the nature of things, is to be attributed to the spirit of his age. He also wrote poems, among others, Degli Eroici Furori, and a satirical comedy, Il Candelajo. A collection of his Italian works by Wagner appeared at Leipzig in 1830 (two vols. 8vo); a reprint of a Latin work, De Umbris Idearum (original, Paris, 1582), at Berlin in 1868; and a biography by Domenico Berti, at Florence in 1868, which is of special interest and importance on account of the new papers it brings to light regarding the official examination of Bruno before the Inquisition of Venice. Among recent writers, Schelling resembles him the most in his metaphysics and his philosophical views of nature, and has given his name to one of his philosophical writings, Bruno, oder über das göttliche und natürliche Princip der Dinge (Berlin, 1802). See Bartholmès, Jordano Bruno de Nola (two vols., Paris, 1846).

BRUNO, or BRUNI (BRUNUS), LEONARDO, of Arezzo, whence his name *Aretino* (Aretinus), was one of the most famous of the literati at the period of the revival of classic literature in Italy. He was born in 1370, and studied law at Florence and Ravenna, but the arrival of Emanuel Chrysoloras at Florence gave him a decided turn for classical learning. He afterwards filled many offices in the Roman Catholic Church, and accompanied Pope John XXIII. to Constance, where the latter was deposed, and Bruno escaped to Florence. Here he wrote his Florentine History, received in consequence the rights of citizenship, and afterwards, by the favour of the Medici, became secretary to the republic. In this important post he died, A.D. 1444. The merits of Bruno in spreading and advancing the study of Greek literature consist particularly in his literal Latin translations of the classics; for instance, the writings of Aristotle, the orations of Demosthenes, the biographies of Plutarch, &c. His writings are in the Latin language, with the exception of two biographies of Dante and Petrarca. His chief works are, Historiæ Florentinæ (twelve books, Strasburg, 1610, folio), with which is connected the Commentarius Rerum suo Tempore Gestarum, published in Italian at Venice (1476, folio); De bello Italico adversus Gothos; Epistolæ, &c.

BRUNSWICK (German, *Braunschweig*), a duchy and sovereign state in the N.W. of Germany, forming a portion of the Germanic Empire. It comprises 1425 English miles, and 311,715 inhabitants. It is divided into eight districts — three larger and five smaller, detached from each other and surrounded by foreign possessions. About one-half of the land is arable. The family of Brunswick is one of the most ancient in Europe. (See BRUNSWICK—FAMILY OF.) In 1806 the duchy was annexed by Napoleon to the Kingdom of Westphalia, but its native prince, Frederick William, was restored in 1813. In the German Confederation Brunswick held the thirteenth rank, with two votes in the assembly, and one along with Nassau in the diet. It was afterwards a member of the North German Union, formed consequent to the dissolution of the old confederation by the victories of Prussia in the short campaign of 1866. As a state of the German Empire it now sends two members to the Bundesrath, and three deputies to the Reichstag. In its internal government Brunswick is a constitutional monarchy. The representative assembly consists of twenty-one deputies of the principal taxpayers, ten deputies of towns, twelve of communes, and three of the clergy. The budget is voted triennially; that for 1870–72 is 7,196,400 thalers, or £1,079,460. The prevailing religion in Brunswick is Lutheran. The most important articles of trade and manufacture are corn, rape-seed, flax, tobacco, chicory, hops, madder, and wood. The country raises sheep, swine, goats, poultry, and bees in sufficient quantities to supply the inhabitants. Some fat cattle and horses are imported. In the forests there are wild boars, deer, hares, heath-cocks, black-cocks, partridges, and hazel-grouse; but as no attempts are made to preserve the game, the quantity gradually decreases. The mountainous tracts yield iron, copper, salt, marble, coal, porcelain earth, and other minerals. In the Rammelsberg are found silver, copper, lead, arsenic, vitriol, and sulphur, with small quantities of gold. Large tracts are covered with peat, in the sandy regions of the northern districts. The breweries and distilleries of spirits, the spinning of linen yarn (the most extensive branch of industry), the manufacture of linen and leather, the preparation of paper, soap, tobacco, sal-ammo-

niac, madder, and chicory, afford the principal employment of the people. The lackered wares and porcelain of Brunswick are famous even in foreign countries. Brunswick, the capital, is the centre of trade. The country is provided with good roads.

BRUNSWICK (German, *Braunschweig*), capital of the duchy of the same name, is situated on the Ocker, and on the railway from Hanover to Berlin, with 57,782 inhabitants in 1871. It was formerly one of the free cities of Germany, but it is now subject to the duke, and has been the ducal residence since 1754. The principal buildings are the new ducal palace, the mint, the house in which the diet assembles, the town-house, the arsenal, the cathedral, museum and picture-gallery, and the public wine-cellars. The ramparts of the old fortifications have been levelled and formed into a promenade. The older streets are narrow and tortuous, and antiquated in appearance. The Collegium Carolinum was founded in 1745, and intended as a medium between the common schools and the universities. It has enjoyed a high reputation even in foreign countries, particularly in England and Russia. The principal manufactures are wool, yarn, linen, porcelain, pasteboard, paper-hangings, and chemical preparations. There is a large commerce in grain, woollens, and manufactured articles. The traffic in home produce, and the carrying trade, have been much increased by the system of railways. The Brunswick fairs, though now declining, were formerly of great importance.

BRUNSWICK, a post town of Maine, in the United States of America, in Cumberland county, on the right bank of the Androscoggin, 26 miles N.E. of Portland; lat. 43° 53′ N.; lon. 69° 55′ W.; pop. of township in 1871, 4687. The falls of the Androscoggin, at this place, afford excellent seats for several mills and manufactories. Bowdoin College, in this town, was incorporated in 1794, and went into operation in 1802. Connected with it is the medical school of Maine, established in 1820. It is pleasantly situated on an elevated plain, about half a mile from the Androscoggin. It has a president and fourteen professors. The students number about 200, besides fifty medical students. The library numbers about 30,000 volumes. Hawthorne and Longfellow graduated here in 1825, and the latter filled the chair of modern languages for several years. Bowdoin College was founded by James Bowdoin, son of the governor of Massachusetts, and is the oldest and most prominent literary institution in Maine.

BRUNSWICK, FAMILY OF. The true founder of this ancient house was Albert Azo II., marquis of Reggio and Modena, a descendant by the female line of Charlemagne, who had also extensive domains in Lombardy, and in 1047 married Cunigunda, heiress of the Counts of Altorf, and thus united the two houses of Este and Guelph. The previous history of the Este family is uncertain. Guelph, the son of Azo, was created Duke of Bavaria in 1071. He married Judith of Flanders, who was descended from Alfred the Great of England. The most powerful of this line was Henry the Proud, who succeeded in 1125, and by his marriage with the daughter of Lotharius II. acquired Brunswick and Saxony. Brunswick ultimately fell to a younger branch of the family, and Otho, the great-grandson of Henry by this branch, was the first who bore the title of Duke of Brunswick (1235). John, eldest son of Otho, founded the house of Lüneburg. Albert the Great, a younger son of Otho, conquered Wolfenbüttel, and on his death (1278) his three sons divided his dominions. Henry founded the house of Grubenhagen, Albert became Duke of Brunswick, and William Duke of Brunswick Wolfenbüttel. Henry Julius, of this last branch, inherited Grubenhagen (1596). Ernest of Zell, of the second branch, who succeeded (1532), conquered the territories of Wolfenbüttel, and left two sons, by whom the family was divided into the two branches of Brunswick-Wolfenbüttel (II.) and Brunswick-Hanover, from the latter of which comes the present royal family of Britain. The former is the German family now in possession of the duchy of Brunswick. Charles William married Augusta, sister of George III. of England (1764). His descendants are presumptive heirs to the throne of Great Britain in case of a failure of the direct line. Ernest Augustus, of the Brunswick-Hanover house, was created Elector of Hanover in 1692. He married Sophia, daughter of Elizabeth, the daughter of James I. of England. George Louis, son of Ernest Augustus and Sophia, born 1660, succeeded his father as Elector of Hanover in 1698, and was called to the throne of Great Britain in 1714, by act of Parliament passed in the reign of Queen Anne, which vested the succession in the Protestant line of James I. George IV. was the twenty-third of the family of Brunswick by lineal descent from Azo, the fifty-third king of England from Egbert, and was descended from Woden, the head of the ancient Saxon family (from which so many sovereigns of Europe have sprung), by fifty-two generations. See the articles GEORGE, HANOVER, ENGLAND, &c.

BRUNSWICK, FERDINAND, DUKE OF, fourth son of Duke Ferdinand Albert, was born at Brunswick, Jan. 11, 1721, and educated for the military profession. In 1739 he entered the Prussian service, was engaged in the Silesian wars, and became one of the most eminent generals in the Seven Years' war. He commanded the allied army in Westphalia, where, always opposed to superior forces, he displayed superior talents. He drove the French from Lower Saxony, Hesse, and Westphalia, and was victorious in the two great battles of Crefeld and Minden. (See SEVEN YEARS' WAR.) After the peace he resigned his commission on account of a misunderstanding between him and the king. From that time he lived at Brunswick, the patron of art and literature. He died in 1792.

BRUNSWICK, FRIEDRICH WILHELM, DUKE OF, fourth and youngest son of Duke Karl Wilhelm Ferdinand of Brunswick. He was born in 1771, and received the same education with his second and third brothers, who were a few years older, till the military career to which he was destined gave his studies a particular direction. In 1786 he was appointed by the King of Prussia successor of his uncle, Frederick Augustus, duke of Oels and Bernstadt. He then went to Lausanne, remained two years in Switzerland, and upon his return was made captain in a Prussian regiment of foot. During the war against France in 1792 and the following year, he fought in the Prussian armies, and was twice wounded. In 1806 he took part in the war against France, with all the fire which the oppression of Germany and his father's unhappy fate had kindled in him. He finally joined the corps of Blücher, and was made prisoner with him at Lubeck. On the death of his eldest brother he would have succeeded to the dukedom, as his other brothers were incapacitated by disease, but Napoleon prohibited his succession. He raised a free corps in Bohemia to operate against the French, but though he gained a victory over 4000 Westphalians, he was unable to make an effectual stand on the Continent. He embarked his troops for England, landed in 1809, and was received with enthusiasm. His corps immediately entered the British service, and was afterwards employed in Portugal and Spain. The Parliament granted him a pension of £6000, until he returned to his hereditary dominions, Dec. 22, 1813. The events of 1815 called him again to

arms, and he fell, June 16, 1815. Caroline, queen of England, the unfortunate wife of George IV., was a sister of this gallant prince.

BRUNSWICK, NEW. See NEW BRUNSWICK.

BRUNSWICK-LÜNEBURG, KARL WILHELM FERDINAND, DUKE OF, was born in 1735. He was the eldest son of the reigning duke Charles of Brunswick and of a sister of Frederick the Great. At the age of seven his education was committed to the Abbé Jerusalem, then chaplain to the court at Wolfenbüttel. At the age of twelve he entered, under the superintendence of Jerusalem, the Collegium Carolinum, then recently established. His tutor was the chamberlain Von Wittorf—a man of talents, but without principle. His ambition was early kindled by the achievements of Frederick II. The Seven Years' war afforded him the first opportunity of cultivating his military talents. He commanded the Brunswick troops in the allied army, and in the fatal battle at Hastenbeek, July 28, 1757, in which he recaptured a battery that had been taken by the French in the centre of the allied army, 'he showed' (such was the expression of Frederick) 'that nature had destined him for a hero.' June 23, 1758, he decided the victory of Crefeld. He took the most active part in all the enterprises of his uncle Ferdinand; and Frederick's esteem for him continued to increase, as appears from his Geschichte des Siebenjährigen Kriegs (History of the Seven Years' War), and his Ode auf den Erbprinzen von Braunschweig (Ode on the Hereditary Prince of Brunswick). In 1764 he married the Princess Augusta of England. Having early become acquainted with the real situation of his native country, and drawn salutary instruction from the constant embarrassments of his father, before he entered upon the government, he practised the greatest economy, living mostly retired from public business, and devoted to the arts and sciences. In 1773 he entered the Prussian service and became general of infantry, but had no opportunity of cultivating his military talents. After the death of his father (in 1780) he entered upon the government with zeal and activity. Anxious above all for the improvement of the finances, he diminished his household, discharged the debts of the state, encouraged agriculture, extended the liberty of commerce, undertook or assisted in the erection of considerable buildings, and by causing Italian operas, masquerades, &c., to be exhibited gratis, provided also for the amusement of the public. Yet, with the best intentions, he was often unsuccessful. This was the case with his plans for the improvement of public education. He invited men of learning into the country at great expense, but the projected reformation having met with innumerable obstacles, they became a burden to the state. In 1787 he was obliged to place himself at the head of a Prussian army for the support of the stadtholder of Holland. The facility with which this campaign was terminated procured the duke more reputation than he perhaps deserved. High expectations were entertained of him when the wars of the French revolution broke out. The duke received the chief command of the Austrian and Prussian army, and issued at Coblenz, July 15, 1792, the famous manifesto, drawn up in a very harsh and haughty style by a Frenchman, De Limon. It certainly did more injury to the allied forces than a hostile army could have done. It inflamed the French nation almost to fury against the insolent conquerors, who intended 'to make every city that dared to resist level with the ground, and to cut their way to Paris.' The Emperor Francis approved it, and so did the King of Prussia; but the duke considered the expressions too strong. The severest passages were expunged; but its tone was still very insolent. The duke designed to press forward from Lorraine to Paris, to cut off its supplies, and thus to force it to surrender by famine. Aug. 23, 1792, Longwy was taken, and, Sept. 2, Verdun. But in Champagne, a country of itself unproductive, the transport of provisions for the army from the frontiers was rendered difficult by mountains and forests. Dumouriez was encamped in the vicinity of St. Menehould, and skirmishes took place daily; but the skilful dispositions of Dumouriez culminated in the defeat of the Germans by Kellermann at Valmy, on 20th Sept. 1792, and Brunswick-Lüneburg was obliged to conclude an armistice, and to evacuate Champagne. Custines took Worms and Spires during this retreat, and, Oct. 21, captured the fortress of Mentz, and soon afterwards Frankfort, which latter city, however, was retaken by the Prussians and Hessians, Dec. 2. The endeavours of the Germans, therefore, were principally directed to the recapture of those places. To this end the duke, in conjunction with the Austrians, opened the campaign on the Upper Rhine in 1793, took the fortress of Königstein March 7, conquered Mentz July 22, and prepared to attack the strong fortress of Landau, then in the power of the French. The French, on the other hand, Sept. 14, made a general attack on the duke and Wurmser, from Strasburg to Saarbruck. On that day the duke had a sanguinary engagement with Moreau, in the vicinity of Pirmasens, a town belonging to the landgraviate of Hesse-Darmstadt. The French were driven from their camp near the village of Hornbach, as far as to the Saar. A month later the duke, having formed a union with Wurmser, succeeded, October 13, in his attack on the lines of Weissenburg, and his attempt to draw nearer to Landau. In order to gain another strong point of support, he ventured, on the night of Nov. 16, to make an assault upon the mountain-fortress of Bitche, which is the key of the Vosges, as the roads from Landau, Pirmasens, Weissenburg, and Strasburg unite at that place. This attempt miscarried. Between the 28th and the 30th of Nov., however, he defeated a division of the army of the Moselle, at Lautern, which was pressing through the mountains, under the command of Hoche, with the intention of relieving Landau. But the daily attacks of Hoche and Pichegru, without regard to the sacrifice of men, and the successful attempt of the latter to break the Austrian lines near Fraschweiler, Dec. 22, forced the Austrians to retreat beyond the Rhine, and occasioned the retreat of the duke also. As some difficulties had already risen between Austria and Prussia, he laid down the chief command of the army in the beginning of the year 1794. The duke continued to labour for the welfare of his country until the fatal year 1806. Although he was now of such an age that he might have retired without reproach from public life, yet he assumed burdens beyond his powers. At the beginning of the year 1806, commissioned by the King of Prussia, he made a journey to St. Petersburg relative to the war that soon broke out with France. He was then placed at the head of the Prussian army. But his physical strength was not equal to his moral energy, as was proved by the battles of Jena and Auerstädt. He was mortally wounded at the latter battle, and closed his life at Ottensen, near Altona, Nov. 10, 1806.

BRUNTON, MARY, an ingenious novelist, was the daughter of Colonel Thomas Balfour, and was born in the island of Burra, in Orkney, in 1778. In her twentieth year she married Dr. Alexander Brunton, minister at Bolton, near Haddington, afterwards at Edinburgh. She was the authoress of Discipline and Self-Control, two novels which took well with the public. She died in 1818, leaving

Emmeline, a tale, and other pieces, which were published by Dr. Brunton, with a biographical sketch.

BRUSH-WHEELS. In light machinery, wheels sometimes turn each other by means of bristles or brushes fixed to their circumference. They may also communicate circular motion by friction only. The surface brought in contact is then formed of the end grain of wood, or is covered with an elastic substance, and the wheels are pressed together to increase the friction.

BRUSSA, BRUSA, or BURSA, a Turkish city in the pashalic of Anatolia (Asia Minor), with a pop. of about 100,000 Turks, Greeks, Armenians, and Jews, engaged in commerce, and the manufacture of satins, silk stuffs, carpets, gauze, &c. In the manufacture of silk stuffs about 30,000 persons are employed, most of whom belong to the town itself, some to the surrounding district. These stuffs are in great demand over all the East, but their sale has been somewhat diminished since the Swiss have succeeded in providing excellent imitations in cotton of many of the silk patterns of Brussa, for which imitations a ready sale is found throughout Syria and Asia Minor. The bazaars are filled with merchandise, and the caravans passing from Aleppo and Smyrna to Constantinople promote its commerce. Before the earthquake of 1855 it contained close upon 150 mosques, and was adorned with an immense number of fountains; but by the earthquake in that year, and by a terrible conflagration, the former splendour of the town must have suffered considerably. It is situated in a fertile and finely wooded plain, which is inclosed by the ridges of Olympus, and abounds in hot springs. A railway is about to be constructed between Scutari and Brussa. The port of Brussa is Kemlik or Ghemlek, on the Sea of Marmora. The castle, which is about a mile in circumference, is supposed to be the Prusa of the ancients. Brussa was long capital of Bithynia, and one of the most flourishing towns in the Greek Empire of Constantinople. In 1326 it was taken by Orkhan, son of Othman, founder of the Ottoman dynasties; and from that epoch it was the residence of the Turkish sovereigns, until the seat of empire was transferred to Adrianople.

BRUSSELS (Flemish, *Brussel;* French, *Bruxelles*), the capital of Belgium and of the province of South Brabant, is situated on the small river Senne, about 50 miles S.E. of the German Ocean; lat. 50° 51′ N.; lon. 4° 22′ E. Brussels is built partly on the acclivity of a hill, partly on the plain, in a country agreeably diversified by sloping heights. Like many other continental towns whose political situation has changed, its old fortifications have been transformed into boulevards. These surround the city on N.E. and S., extending for 5 miles from N. to S.; they are planted with elms and linden trees in four rows, and form a wide and agreeable promenade, commanding an extensive view of the surrounding country. The numerous gates, most of which bear the names of the principal high-roads or railways which traverse the kingdom, are nearly all modern, but the Porte de Hal, built in 1379, is a remnant of the ancient ramparts, a large military tower of remarkable construction, which in later days was long used as a prison. The city at its greatest extent is about 3 miles in length by 2½ wide. The Senne enters by two branches on the N.W. side, and forms four islands within the walls. It is not navigable, but Brussels possesses water communication by means of canals with Charleroi, Mechlin, Antwerp, and the ocean. The Antwerp Canal was opened in 1551, that with Charleroi in 1830. Nearly everywhere within the walls Brussels presents a congeries of twisted streets. The upper or new town, containing the royal palace, is the principal exception. The suburbs outside the boulevards, especially in the upper town, are large, and have recently greatly increased. The principal are the Quartier Leopold and the Quartier Louise, which are regularly and elegantly built. The principal buildings of the new town are the king's palace, the palace of the chambers, the palace of 'the Prince of Orange,' the palace of the fine arts, the public library and museum, and the church of Notre-Dame-de-Bon-Secours. The upper town is ornamented with a fine park of 17 acres, with fountains and statues, around which most of the principal buildings are situated. The lower town is rich in ancient architecture. The hôtel de ville (built 1401–55) is an imposing Gothic structure, with a spire 364 feet in height. The square in front of it is perhaps the most pictorial of all the public places of Brussels. The cathedral of Saint Gudule is the finest of many fine churches, richly adorned with sculptures and paintings. It was founded in 1010, and its reconstruction, commenced in 1226, was carried on till the seventeenth century. The churches of Notre-Dame-de-la-Chapelle and Notre-Dame-des Victoires are also edifices of great beauty. The monuments of Brussels, and the specimens of painting and sculpture with which its public buildings are adorned are too numerous to mention.

During the middle ages Brussels did not attain to the extent or importance of several other cities of the Low Countries. The Emperor Otho dated a decree from Brussels in 976. It was walled by Baldric, count of Louvain, in 1044. It was more completely fortified in 1380, the wall then following nearly the line of the present boulevard. During the fifteenth century it was twice burned and once ravaged by the plague. It was the scene, in 1568, of the execution of Counts Egmont and Horn. It was bombarded and burned by the French in 1695, and was the head-quarters of Marlborough after the battle of Ramilies. It was taken by the French in 1794, and retained till 1814, when it became the chief town of the department of the Dyle. From 1815 to 1830 it was one of the capitals of the Kingdom of the Netherlands, and in 1830 it was the chief centre of the revolt which separated Belgium from Holland. Since then it has been the capital of the Belgian kingdom, and one of the centres of European civilization, being especially distinguished, far beyond its relative importance, for the cultivation and patronage of art.

The scientific, literary, artistic, and benevolent institutions of Brussels comprise a free university, founded in 1834, a proprietary institution, with about sixty professors and assistants, comprising four faculties, mathematical and physical sciences, belles-lettres, law, and medicine, a school of geography, founded in 1830, with an extensive museum, embracing geology, chemistry, and natural history, one of the finest observatories in Europe; the Belgian Royal Academy of Sciences, Letters, and Fine Arts, and the Royal Academy of Fine Arts; the public library, containing 200,000 volumes and 18,000 valuable manuscripts; the picture gallery, with the finest specimens of Flemish art; the Royal School of Medicine, many institutions for elementary education, societies of horticulture and other natural sciences, several hospitals, an infirmary, a philanthropic society, &c.

The manufactures and trade of Brussels are greatly promoted both by its canal communications and by the net-work of Belgian railways. Printing, type-founding, and all the other departments of book-making, give employment to a large section of the population. Until 1852 the reprinting of French contemporary works was extensively carried on,

but in that year a treaty with France gave protection to works of literature and art. Lace was an ancient manufacture, and is still of some importance; the printing of cotton and woollen fabrics, muslins, &c., and many minor manufactures are carried on. Brussels carpets are chiefly made at Tournai, but some are manufactured in the city. There are breweries, distilleries, sugar-refineries, foundries of iron and brass, steam-engine factories, &c. The trade carried on by the canals and railways is that of a capital city and manufacturing town, for the supply of internal wants and the distribution of its own products. The languages spoken in Brussels are French, and Flemish or Dutch, the former chiefly spoken in the new town, the latter chiefly in the old. English is also a good deal spoken, from the number of English residents and visitors. The pop. of Brussels is estimated, in 1869, without the suburbs, at 171,377; and in 1870, including the suburbs, at 314,077.

BRUSSELS SPROUTS, one of the cultivated varieties of cabbage (*Brassica oleracea sabauda*). They have an elongated stem 4 or 5 feet high, and small green heads like miniature cabbages. They are cultivated for the table and are considered a delicacy.

BRUTUS, or BRUTE, in the fabulous history of Britain, was the first king of the island, according to Geoffrey of Monmouth. He is said to have been the son of Sylvius, and grandson of Ascanius, the son of Æneas, and to have been born in Italy. He landed at Totness, in Devonshire, destroyed the giants who then inhabited Albion, and called the island from his own name. At his death, the island was divided among his three sons: Locrine had England, Cumber Wales, and Albanact Scotland.

BRUTUS, LUCIUS JUNIUS, son of Marcus Junius and the daughter of the elder Tarquin, saved his life from the persecutions of Tarquin the Proud by feigning himself insane, on which account he received the surname *Brutus* (stupid). During a plague that broke out at Rome he accompanied the son of Tarquin to the oracle in Delphi. When Lucretia, the wife of Collatinus, plunged a dagger into her bosom, that she might not outlive the insult which she had suffered from Sextus, the son of Tarquin, Brutus, being present, threw off the mask. He drew the dagger, all bloody, from the wound, and swore vengeance against the Tarquins, explaining to the astonished spectators the reason of his pretended imbecility, and persuading all who were present to take the same oath. The people submitted to his guidance, and he caused the gates to be shut, the inhabitants to be assembled, and the body to be publicly exposed. He then urged the banishment of the Tarquins. After this had been resolved on, Brutus proposed to abolish the regal dignity, and introduce a free government. It was then determined that two consuls should exercise supreme power for a year, and Junius Brutus and Tarquinius Collatinus were chosen for the first term. Tarquin, who had seen the gates shut against him, and found himself deserted by his army, sent ambassadors to Rome to demand a restoration of his private property, and, at the same time, to promise that he would make no attempt against the republic. His request was granted. The ambassadors, however, set on foot a conspiracy, and drew into it many young men, among whom were the two sons of Brutus and the nephews of Collatinus. But a slave named Vindex discovered the plot. The criminals were imprisoned, and the consuls caused the people the next morning to be called to the *comitia*. All were deeply shocked to see the sons of Brutus among the prisoners, and their father on the judgment-seat to condemn them. Collatinus wept, and even the stern Valerius sat silent. But Brutus arose firmly, and, after their crime had been proved beyond a doubt, ordered the lictors to execute the law. Neither the entreaties of the people nor of his sons could alter his resolution. He witnessed the horrible spectacle without emotion, and did not leave the assembly until after the execution. He was called back, however, when Collatinus wished to save his guilty nephews. The people condemned them all, and chose Valerius consul in place of Collatinus. In the meantime, Tarquin, supported by Porsenna, collected an army and marched against Rome. The consuls advanced to meet him. Brutus led the cavalry; Aruns, son of Tarquin, commanded the body opposed to him. They pierced each other with their spears at the same moment, and both fell, B.C. 509. The Romans came off conquerors, and Brutus was buried with great splendour. The women lamented him a whole year, as the avenger of the honour of their sex. The details of the story of Brutus, which may be regarded as a poetical legend, have been shown by Niebuhr to be irreconcilable with history. The surname Brutus is supposed by modern scholars to be nearly equivalent, in early Latin, to that of Severus, which was common at a later period. It was the surname of a plebeian family which played an important part in the history of Rome.

BRUTUS, MARCUS JUNIUS, was born B.C. 85. This republican resembled in spirit, as well as in name, the expeller of Tarquin. He was at first an enemy of Pompey, who had slain his father in Galatia, but forgot his private enmity, and was reconciled to him when he undertook the defence of freedom. He did not, however, assume any public station, and, after the unfortunate battle of Pharsalia, surrendered himself to Cæsar, who received him generously, allowed him to withdraw from the war, made him in the following year governor of Cisalpine Gaul, and afterwards conferred on him the government of Macedonia. Notwithstanding these benefits, Brutus allowed himself to be drawn into, and made the head of the conspiracy against Cæsar. He was led into the conspiracy by Cassius, who, impelled by hatred against Cæsar, as well as by the love of freedom, sought, at first by writing, and then by means of his wife, Junia, sister of Brutus, to gain his favour; and when he thought him prepared for the proposal, disclosed to him verbally the plan of a conspiracy against Cæsar, who was then aiming at the supreme power. Brutus agreed to the design, and his influence led many of the most distinguished Romans to embrace it also. Cæsar was assassinated in the senate-house. In public speeches Brutus explained the reasons of this deed, but he could not appease the dissatisfaction of the people, and retired with his party to the capitol. He soon after took courage, when the consul P. Cornelius Dolabella, and the prætor L. Cornelius Cinna, Cæsar's brother-in-law, declared themselves in his favour. But Antony, whom Brutus had generously spared, was reconciled to him only in appearance, and obtained his leave to read Cæsar's will to the people. By means of this instrument Antony succeeded in exciting the popular indignation against the murderers of Cæsar, and they were compelled to flee from Rome. Brutus went to Athens, and endeavoured to form a party there among the Roman nobility; he gained over, also, the troops in Macedonia. He then began to levy soldiers openly, which was the easier for him, as the remainder of Pompey's troops, since the defeat of their general, had been roving about in Thessaly. Hortensius, the governor of Macedonia, aided him; and thus Brutus, master of all Greece and Macedonia, in a short time stood at the head of a powerful army. He went now to Asia,

and joined Cassius, whose efforts had been equally successful. In Rome, on the contrary, the triumvirs prevailed. All the conspirators had been condemned, and the people had taken up arms against them. Brutus and Cassius having with difficulty subdued the Lycians and Rhodians, returned to Europe to oppose the triumviri. (Plutarch informs us that a spirit appeared to Brutus, on his march from Sardis to Abydos, in Asia Minor.) The army passed over the Hellespont, and nineteen legions and 20,000 cavalry were assembled on the plains of Philippi, in Macedonia, whither also the triumvirs, Antony and Octavianus, marched with their legions. Although the Roman historians do not agree in their accounts of the battle of Philippi, this much at least seems certain, that Cassius was beaten by Antony, and caused himself to be killed by a slave; that Brutus fought with greater success against the division of the army commanded by Octavianus, who was hindered by indisposition from conducting the battle in person; that Brutus, after the engagement, took possession of an advantageous situation, where it was difficult for an attack to be made upon him; twenty days after, he was induced, by the ardour of his soldiers, to renew the contest, and was this time unsuccessful. He was totally defeated, escaped with only a few friends, passed the night in a cave, and as he saw his cause irretrievably ruined, ordered Strato, one of his confidants, to kill him. Strato refused, a long time, to perform the command; but, seeing Brutus resolved, he turned away his face, and held his sword, while Brutus fell upon it. Thus died Brutus (B.C. 42), in the forty-third year of his age. There are some fragments of Brutus' writings extant, but they are mixed up with many forgeries.

BRUYÈRE, JEAN DE LA, the famous author of the Charactères, in which he depicts the manners of his age, was born, according to Jal, at Paris in 1645; others say at Dourdan in 1639 or 1644. He purchased the place of treasurer at Caen; but a short time after, through the influence of Bossuet, he was employed in the education of the Duke of Bourbon, grandson of the great Condé, with a pension of 3000 livres, and was attached to his person during the remainder of his life. In 1687 he translated the Characters of Theophrastus into French with much elegance, and accompanied them with a succession of characters, in which he represented the manners of his time with great accuracy, and in a style epigrammatical, ingenious, and witty. Bruyère often took his characters from living persons, although he denied it, and seems, by this means, to have gained many enemies. He was a man of pleasant manners and amiable disposition. In 1693 he was elected a member of the French Academy, with some opposition, and died in 1696.

BRUYN, CORNELLE LE, a painter and traveller, born at the Hague in 1652; died 1719. He went in 1674 to Rome, where he studied his art for two years and a half. He then followed his inclination for travelling; visited Naples and other cities of Italy, embarked for Smyrna, travelled through Asia Minor, Egypt, and the islands of the Archipelago, noting down and drawing all that he found worthy of his attention. He afterwards settled in Venice, and became a disciple of Carlo Lotti. In 1693 he returned to his native country, and published his travels in 1698. The favourable reception of this work excited in him the desire to travel anew. He visited, in 1701 and the following years, Russia, Persia, India, Ceylon, and other Asiatic islands. In Russia he painted Peter the Great and different princes of his family; in 1706, in Batavia, some of the principal men. In 1708 he returned to his country, where he published an account of his second journey, the value of which, like that of the first, consists more in the beauty and correctness of the drawings than in the trustworthiness of the statements. During the rest of his life Le Bruyn was occupied exclusively with his art, passed his time alternately at the Hague and at Amsterdam, and died at Utrecht, in the house of his friend and protector Van Mollem. A translation of his voyage to the Levant appeared in London, 1702.

BRYANT, JACOB, a philologist and antiquary, was born at Plymouth in 1715, and died in 1804 at his country seat, near Windsor. He studied at Eton and Cambridge, became afterwards tutor of the sons of the famous Duke of Marlborough, the eldest of whom he also accompanied to the Continent as his secretary. After his return he received, by the influence of his patron, a lucrative post in the ordnance, which gave him leisure for his researches into Biblical, Roman, and Grecian antiquities. His most important work is the New System of Ancient Mythology, which appeared in three vols. 4to, 1774-76. Whatever may be the ingenuity and the learning of the author, it is justly objected that he has taken conjectures for proofs, and, in particular, that he has trusted too much to the deceptive conclusions of etymology. He was engaged in a famous dispute on the veracity of Homer and the existence of Troy, in which he endeavoured to show that there never was such a city as Troy, and that the whole expedition of the Greeks was a mere fiction of Homer. The object of one of his earlier treatises, which appeared in 1767, is to show that the island Melita, on which St. Paul was wrecked, was not Malta, but situated in the Adriatic. He endeavoured to illustrate the Scriptures by explanations drawn from Josephus, from Philo the Jew, and from Justin Martyr; but in this, as in all his writings, his learning and his ingenuity are misled by his love of controversy and paradox.

BRYDONE, PATRICK, F.R.S., a celebrated traveller, was the son of the minister of Coldingham, Berwickshire, and born there in the year 1741; died 1818. He received a university education, and acted as travelling tutor first to Mr. Beckford of Somerly, in Suffolk, with whom he made a tour on the Continent in 1767-78, and next to Mr. (afterwards Colonel) Fullarton, with whom he made his famous tour through Sicily and Malta in 1770. His account of this last was published in 1773, and became immensely popular, both from the interest of the narrative and a vivacity and elegance of style which hitherto had been unknown in books of travel. An attempt made by him to prove the remote antiquity of the earth from the relative condition of the layers of lava deposited by eruptions of Mount Etna, provoked a keen contest at a time when the Bucklandian theory, now so generally entertained on this subject, was unheard of. Brydone was subsequently appointed a comptroller of stamps, and married a daughter of Dr. Robertson the historian. The latter part of his life was spent in dignified retirement at Lennel House, near Coldstream.

BRYOZOA (Gr. *bryon*, moss; and *zoon*, an animal), an order of compound polypes, which incrusts foreign bodies like moss. The Bryozoa approximate in their individual organization to the lower molluscs.

BRZESE-LITEWSKI, a fortified town of Russia, in the government of Grodno, on the right bank of the Bud, 108 miles S. of Grodno. It contains a considerable number of Jews, and has a synagogue. Its trade in grain, hemp, flax, &c., is considerable. Pop. 22,493.

BUBNA LITTIZ, FERDINAND, COUNT OF, born at Zamersk, Bohemia, 1768, of an old family, was, early in life, the chamberlain of the Emperor of

Austria, afterwards entered the military service, and after distinguishing himself on various occasions, at Manheim, in the defence of Bohemia (1800), and at Austerlitz, he gained at Wagram, in 1809, the rank of field-marshal-lieutenant. At the end of 1812 he was sent by his court with extraordinary commissions to Napoleon at Paris, and in May, 1813, was sent again to him at Dresden. In the war of 1813 he commanded an Austrian division with much honour, was present at the battles of Lützen, Bautzen, Dresden, and Leipzig, and in 1814 received the chief command of the Austrian army which was to pass through Geneva to the s. of France. He advanced upon Lyons, which was defended by Marshal Augereau, but was unsuccessful in his attacks upon the city, till the corps of Bianchi and Hessen-Homburg came to his assistance, upon which the Prince of Hessen-Homburg took the chief command. Bubna remained at Lyons till the return of the allied forces, and then retired to Vienna. After the landing of Napoleon in 1815, he again led a corps, under Frimont, against Lyons, and in Savoy opposed Marshal Suchet, till Paris was conquered, and the marshal retreated beyond Lyons. He then took possession of Lyons without opposition, established a court-martial to punish the disturbers of public order, and proceeded with greater severity than on his former campaign. In September he marched back to Austria, and received for his services valuable estates in Bohemia from the emperor. In the insurrection of Piedmont, 1821, the Count de Bubna received the chief command of the Austrian troops destined to restore the ancient government. After the accomplishment of this commission, he was appointed general commandant of Lombardy. He died at Milan, June 6, 1825, in the fifty-sixth year of his age.

BUCCANEERS, a name applied to various bands of English and French freebooters in America, whose exploits form one of the most remarkable parts of the history of the seventeenth century. The origin of these associations of buccaneers seems to have been the arrogant pretensions of the Spaniards to the dominion of the whole of America. The English and French settlers combining against them for mutual defence, acquired from their precarious life in the vicinity of the Spanish settlements, adventurous and lawless habits, and became ultimately, in some of the islands of the Caribbean Sea, little better than pirates. The earliest association of this kind began about 1525, but they afterwards assumed greater magnitude. After the assassination of Henry IV. in France in 1610, several Frenchmen sought a residence on the island of St. Christopher, one of the Antilles. Driven thence in 1630, some of them fled to the western coast of St. Domingo, others to the small island of Tortugas, in the vicinity. Several Englishmen, led by a similar disposition, associated themselves with the latter. The fugitives at St. Domingo employed themselves especially in the chase of wild cattle, of which there were large herds on the island. They sold the hides to the mariners who landed on the coast, and as they cured the flesh by smoking it before the fire, like the American savages, they were called *buccaneers*, from the Caribee *boucaw*, a term for smoke-dried meat. These hunters lived in the rudest state of nature, enjoying in common all that they had taken in the chase or acquired by robbery. The Spaniards, who could not conquer them, determined to extirpate all the cattle on the island, and thus obliged the buccaneers either to cultivate the land as husbandmen, or to join the other freebooters on the island of Tortugas. These bold adventurers attacked, in small numbers and with small means, but with an intrepidity which bade defiance to danger, not only single merchant vessels, but several of them together, and sometimes armed ships. Their common mode of attack was by boarding. They directed their efforts especially against the Spanish ships which sailed for Europe laden with the treasures of America. By the repeated losses which they suffered, the Spaniards were at last so discouraged, that they seldom offered a serious resistance. It happened once that a ship of the buccaneers fell in with two Spanish galleons, each of which had sixty cannon and 1500 men on board. To escape was impossible, and the pirates could not think of surrender. Their captain, Laurent, made a short speech to them, sent one of his men to the powder-room with orders to set fire to it upon the first sign which he should give him, and then placed his men in order of battle on each side. 'We must sail between the enemy's ships,' cried he to his crew, 'and fire upon them to the right and left.' This manœuvre was executed with extraordinary rapidity. The fire of the pirate killed so many people on board both ships, that the Spaniards were struck with a panic, and let him escape. The Spanish commander was afterwards put to death on account of the disgrace which he had brought upon his nation. Their frequent losses greatly reduced the trade of the Spaniards with America. The buccaneers now began to land on the coast, and to plunder the cities. Their manner of dividing the booty was remarkable. Every one who had a share in the expedition swore that he had reserved nothing of the plunder. A false oath was of extremely rare occurrence, and was punished by banishment to an uninhabited island. The wounded first received their share, which was greater according to the severity of their wounds. The remainder was divided into equal parts, and distributed by lot. The leader received more than the others only when he had particularly distinguished himself. Those who had perished in the expedition were not forgotten. Their part was given to their relations or friends, and in default of them, to the poor and to the church. Religion was strangely blended with their vices, and they always began their enterprises with a prayer. The wealth which they acquired was spent in gambling and debauchery, for it was the principle of these adventurers to enjoy the present and not care for the future. The climate and their mode of life gradually diminished their number, and the vigorous measures of the British and French governments at last put an end to their outrages, which had, perhaps, been purposely tolerated. From this band of pirates arose the French settlements on the western half of St. Domingo. In the beginning of the eighteenth century the piracies of the buccaneers had entirely ceased. An account of their mode of life and of many of their deeds is be found in the tenth volume of Raynal's History of the Two Indies, and in Burney's History of the Buccaneers.

BUCENTAUR, in mythology a monster, half man and half ox or ass. The splendid galley in which the doge of Venice annually sailed over the Adriatic on Ascension day also bore this name. Dropping a ring into the sea, he espoused it in the name of the republic, with the words 'Desponsamus te, mare, in signum veri perpetuique dominii.' The custom originated in 1176, when the doge, having refused to deliver up the pope, who had taken refuge in Venice, to the emperor, encountered and defeated the imperial fleet which was sent to reduce the Venetians.

BUCEPHALUS, the horse of Alexander the Great, which he bought for thirteen talents (about £2500). Philonicus, a Thessalian, offered to sell him to King Philip; but Philip, who considered the price too great, commanded the unmanageable steed

to be led away, when the young Alexander offered to mount him. He mounted accordingly, and to the astonishment of all the horse obeyed him, and willingly submitted to his guidance, though he had never before obeyed a rider. Alexander, from this circumstance, conceived such an affection for him that he never rode upon any other horse; and Bucephalus also, when caparisoned for battle, suffered no other rider. He died of a wound, and Alexander caused him to be buried near the Hydaspes, and built over his grave a city, which he called *Bucephala*.

BUCER, MARTIN, born 1491 at Schelestadt, in Alsace. He died in the office of professor of theology at Cambridge, 1551. In 1521 he left the Dominican order, and became a convert to Lutheranism. He was at first preacher at the court of Frederick, the elector of the Palatinate, afterwards in Strasburg, and at the same time professor in the university there for twenty years. He took part in the conference of Marburg with the hope of reconciling Luther and Zwinglius. In 1548 King Edward VI. of England, at the suggestion of Archbishop Cranmer, invited him to Cambridge. In 1557 Queen Mary caused his bones to be burned, to show her detestation of Protestantism. This sentence was repealed, and his memory restored to honour in the reign of Queen Elizabeth. The Cardinal Contarini called him the most learned divine among the heretics. He wrote a commentary on the Psalms under the name of Aretius Filinus, and many other works.

BUCEROS. See HORN-BILL.

BUCH, LEOPOLD VON, a celebrated German geologist, born at Stolpe in Prussia in 1774, studied under the celebrated Werner in the mining school of Freiberg in Saxony, where Alexander von Humboldt was his fellow-student. He early began to distinguish himself by his geological writings. His first works were Descriptions of the Mineralogy of Landeck, and of the Geognosy of Silesia. In 1798 he proceeded to Italy. Up to this period he had adopted the Neptunian theory of Werner, with some modifications; but he now saw cause to abandon it, and to recognize the volcanic origin of the basalts. He saw Vesuvius for the first time in 1799; but afterwards, in 1805, had an opportunity, along with Humboldt and Gay Lussac, of witnessing its actual eruption. In 1802 he examined the extinct volcanoes of Auvergne in the S. of France. The results of all these geological travels were given to the world in a work entitled Observations during Travels in Germany and Italy (two vols. Berlin, 1802–09). Indefatigable as an observer, Von Buch turned his steps from the S. of France in 1806, and proceeding to Scandinavia spent two years in examining its physical constitution. This furnished the materials for his well-known work entitled Travels in Norway and Lapland. In 1815 he visited the Canary Isles along with Christian Smith, a Norwegian botanist, who perished a few years after in the unfortunate expedition of Captain Tuckey to the mouth of the Zaire. These volcanic isles, amid which the Peak of Teneriffe rises so majestically, furnished the starting-point from which Von Buch commenced a regular course of study on the production and activity of volcanoes. This is attested by his standard work on the subject, entitled Physical Description of the Canary Isles (Berlin, 1825, with atlas). On his return from the Canaries he visited the basaltic group of the Hebrides and the coasts of Scotland and Ireland. His geological excursions, even in countries which he had repeatedly visited before, continued without interruption at a very advanced age, till within a few months of his death, which took place at Berlin in 1853. Alexander von Humboldt, who had known him intimately for a period of more than sixty years, calls him the greatest geologist of our period. He was unmarried, and lived aloof from the world, entirely devoted to scientific pursuits. Besides the works already mentioned he was the author of many important tracts on paleontology, as, On the Ammonites, 1832; On the Terebratulæ, 1834; On the Cystidæ, 1845; and on the Ceratites, 1841. Another of his works not to be omitted is his magnificent Geological Map of Germany.

BUCHAN, a district of Scotland, lying partly in Aberdeenshire and partly in Banffshire, along the coast between the mouths of the Deveron and the Ythan.

BUCHAN, WILLIAM, M.D., a popular medical writer, was born in 1729 at Ancrum in Roxburghshire. Being destined by his friends for the church, he repaired to Edinburgh to study divinity. At the university he spent nine years, studying anything rather than theology. At this period of his life mathematics and botany were among his favourite pursuits. Finally he devoted himself wholly to medicine. He enjoyed at this time the friendship of the illustrious Gregory, whose liberal maxims are believed to have had great influence over his future life. Before taking his degree he was induced by the invitation of a fellow-student to settle in practice for some time in Yorkshire. While established in that district he became physician to the Ackworth foundling hospital, in which situation he laid the foundation of that knowledge of the diseases of children which afterwards appeared so conspicuous in his writings. He afterwards removed to Sheffield, where he appears to have spent the years between 1762 and 1766. He then commenced practice at Edinburgh, and for several years was very well employed, though it was allowed that he might have enjoyed much more business if his convivial habits had not distracted so much of his attention. Having for a considerable time directed his attention to a digest of popular medical knowledge, he published in 1769 his work entitled Domestic Medicine; or, the Family Physician—being an attempt to render the medical art more generally useful by showing people what is in their own power, both with respect to the prevention and cure of diseases. The second edition appeared in 1772. The Domestic Medicine is constructed on a plan similar to that adopted by Tissot in his Avis au Peuple. It appealed to the wants and wishes of so large a class of the community, that, considering it to have been the first work of the kind published in Britain, there is no wonder that it should have attained success. Before the death of the author, in 1805, nineteen large editions had been sold. Duplanil of Paris, physician to the Count d'Artois (Charles X.), published a translation in five volumes, with some excellent notes, which rendered the work so popular on the Continent that in a short time no language in Christendom wanted its translation. It would almost appear that the work met with more undivided applause on the Continent than in Britain. While many English and Scottish physicians conceived that it was as apt to generate as to cure or prevent diseases, by inspiring the minds of readers with hypochondriacal notions, those of other countries entertained no such suspicions. Among the testimonies of approbation which Dr. Buchan received from abroad was a huge gold medallion, sent by the Empress Catherine of Russia, with a complimentary letter. The work is said to have become more popular in America and the West Indies than in the older hemisphere. The reputation which the author thus acquired induced him to remove to London, where for many years he enjoyed a lucrative practice. It was his custom to resort daily to the Chapter Coffee-house, near St.

Paul's, where he partly spent his time in conversation with literary and eminent men, and partly in giving advice to patients, who waited upon him here in great numbers just as if it had been his own house. At one time he delivered lectures on natural philosophy, and in this capacity he is said to have manifested as respectable abilities as in his character of a physician. He died in 1805. Besides the above he published two other works:—1. A Treatise on Gonorrhœa; 2. An Advice to Mothers on the Subject of their own Health, and on the Means of Promoting the Health, Strength, and Beauty of their Offspring; each in one volume, 8vo.

BUCHANAN, Claudius, D.D., a clergyman who distinguished himself as a missionary in India, was born at Cambuslang, a village in Scotland, in 1766, and died in 1815. He was educated at the University of Glasgow and Queen's College, Cambridge. He took orders in the Church of England, and was appointed chaplain to the East India Company in 1795. From this time the remainder of his life was occupied in missionary labours in India, and in forwarding the translation of the Bible into the Indian languages. In 1800 he was appointed professor of Greek, Latin, and English in the College of Fort-William. He returned to Europe in 1808, afterwards visited the Holy Land, and was engaged at his death in a translation of the New Testament into Syriac. He published Christian Researches in Asia, with a Notice of the Translation of the Scriptures into the Oriental Languages (1811), and several other works.

BUCHANAN, Francis, M.D., born in Stirlingshire, 15th February, 1762; died, 1829. He travelled extensively in the East Indies, making collections illustrative of the botany, zoology, &c., of the countries which he visited, published in 1807 A Journey from Madras through the Countries of the Mysore, Canara, and Malabar, performed under the orders of the Marquis Wellesley for the purpose of investigating the state of Agriculture, Arts, and Commerce, &c., History, Antiquities, &c., in the Dominions of the Rajah of Mysore, &c. (Lon. 1807). He contributed largely to the scientific journals of the day, and in 1819 he published a History of the Kingdom of Nepal, and in the same year a Genealogy of the Hindoo Gods, which he had drawn up some years before with the assistance of an intelligent Brahmin. In 1822 appeared his Account of the Fishes of the Ganges, with plates.

BUCHANAN, George, one of the most distinguished reformers, political and religious, of the sixteenth century, and the best Latin poet which modern Europe has produced, was born in the parish of Killearn, Stirlingshire, in February, 1506, 'of a family,' as he says himself, 'more ancient than wealthy.' He received the rudiments of his education in the school of his native village, and having at an early period given indications of genius, his maternal uncle, James Heriot, was induced to undertake the care of his education, and sent him in 1520, when fifteen years of age, to prosecute his studies in the University of Paris. Before he had completed his second year there his uncle died, leaving him in a foreign land exposed to all the miseries of poverty, aggravated by bodily infirmity, occasioned, most probably, by the severity of his studies. He was now obliged to return home, and for upwards of a twelvemonth was incapable of applying to any business. In 1523 he joined the auxiliaries brought over from France by Albany, then regent of Scotland, and served as a private soldier in one campaign against the English. Albany soon found himself under the necessity of recrossing the Tweed, and being overtaken by a severe snow-storm in a night march toward Lauder, lost a great part of his army; Buchanan escaped, but was confined the rest of the winter to his bed. In the ensuing spring he was sent to the University of St. Andrews to attend the prelections of John Mair, or Major, in St. Salvator's College. Having continued one session at St. Andrews, where he took the degree of Bachelor of Arts on the 3d of October, 1525, being then an exhibitioner, he accompanied Major to France the following summer. There he became a student in the Scots College of Paris, and in March was incorporated a Bachelor of Arts—the degree of Master of Arts he received in April, 1528. In June the following year he was elected procurator for the German nation, one of the four classes into which the students were divided, and which included those from Scotland. At the end of two years he was elected a professor in the College of St. Barbe, where he taught grammar three years. Soon after he attracted the notice of Gilbert Kennedy, earl of Cassillis, then studying in Paris; and at the end of three years he was engaged to devote his time entirely to the care of the young earl's education. With this nobleman he resided as a preceptor for five years, and to him he inscribed his first published work, a translation of Linacre's Rudiments of Latin Grammar, which was printed by Robert Stephens in 1533.

In 1536 James V. made a matrimonial excursion to France, and having married Magdalene, daughter of Francis I., returned to Scotland in May, bringing with him Cassillis and George Buchanan. The connection between Buchanan and the earl seems not to have been immediately dissolved: for it was while residing at the house of his pupil that the poet composed Somnium or the Dream, apparently an imitation of a poem of Dunbar's, entitled How Dunbar was desyred to be ane Frier, and a bitter satire upon the impudence and hypocrisy of the Franciscans. This piece of raillery excited the utmost hostility on the part of its objects, and to avoid their vengeance Buchanan had determined to retire to Paris. James V., however, took him under his protection, and retained him as preceptor to his natural son, James Stuart. Buchanan afterwards wrote his Palinodia in two parts, a covert satire, which wounded the ecclesiastics still more painfully than its predecessor; and his Franciscanus, one of the most pungent satires to be found in any language. The Catholic clergy being still the dominant party in Scotland, Buchanan, to avoid persecution, fled to England, and afterwards to France. At Paris, to his dismay he found Cardinal Beaton resident as ambassador from the Scottish court. This circumstance rendered it extremely unsafe for him to remain; happily he was invited to Bordeaux by Andrea Govea, a Portuguese, principal of the College of Guienne, lately founded in that city, through whose interest he was appointed professor of humanity in that afterwards highly famed seminary. Here Buchanan remained for three years, during which he completed four tragedies, besides composing a number of poems on miscellaneous subjects. He was all this while the object of the unwearied enmity of Cardinal Beaton and the Franciscans, who threatened his life. Among his pupils at Bordeaux Buchanan numbered the celebrated Michel de Montaigne, who was an actor in every one of his dramas; and among his friends were not only his fellow-professors, but all the men of literature and science in the city and surrounding country. One of the most illustrious of these was the elder Scaliger, who resided and practised as a physician at Agen; at his house Buchanan and the other professors used to spend part of their vacations. The many excellent qualities of this eminent scholar, and the grateful recollection of his conversational talents, Buchanan has preserved in an elegant Latin epigram, appa-

rently written at the time when he was about to quit the seat of the muses to enter upon new scenes of difficulty and danger. The younger Scaliger was but a boy when Buchanan visited at his father's house; but he inherited all his father's admiration of the Scottish poet, whom he declared to be decidedly superior to all the Latin poets of those times. After having resided three years at Bordeaux, Buchanan removed to Paris, and in 1544 we find him one of the regents in the college of Cardinal le Moire, which station he seems to have held till 1547.

In the year 1547 Buchanan passed into Portugal along with Govea, who was recalled by King John III. to take the superintendence of the newly-founded University of Coimbra. Buchanan had hoped to enjoy greater tranquillity here than in France, which was then, at the beginning of the reign of Henry II., threatened with social convulsions from religious differences. Govea, however, died in less than a twelvemonth, and Buchanan soon found himself exposed to the jealousy of the priests. The Inquisition took him under its cognizance, and sentenced him to be confined in a monastery that he might by the inmates be instructed in the principles and practice of religion. Here he consoled himself by planning and in part executing his unrivalled paraphrase of the Psalms of David. The probability is that the poor monks were incapable of appreciating his labours; but he seems to have gained their good-will, for he was restored to his liberty, and obtained the king's permission to return to France. Immediately on his arrival in Paris he was appointed to a regency in the College of Boncourt. In this station he remained till 1555, when he was engaged by the celebrated Comte de Brissac to act as domestic tutor to his son, Timoleon de Cosse. To this nobleman he had addressed a poetical tribute after the capture of Vercelli, an event which occurred in September, 1553; and to him also he dedicated his tragedy of Jepthes in the summer of 1554. The Comte next year called the poet into Italy, and charged him with the education of his son, who was then twelve years of age, and with whom he parted at the age of seventeen. During the five years of his connection with this illustrious family, Buchanan's residence was alternately in France and Italy; and as his pupil was destined to the profession of arms, and had different masters to attend him, he found leisure for prosecuting his poetical studies, and formed the design, and composed part of his philosophical poem De Sphera, which he addressed to his pupil. His future avocations prevented him from completing this poem. He likewise published the first specimen of his version of the Psalms, and his translation of the Alcestes of Euripides. His ode on the surrender of Calais was also composed while in Brissac's family. But much of his spare time was employed in examining the grounds of his religious belief, and settling to his own satisfaction the great question between the Romish and the Reformed Churches. He had all along inclined to the side of the Reformed; but he had not yet relinquished his connection with the ancient church. The result of this examination was a perfect conviction that many of the Romish doctrines were erroneous, and the discipline of the Church depraved and perverted; and consequently that separation was imperative upon all who had any regard to the Word of God; and no sooner did he arrive in Scotland than he acted accordingly.

As Buchanan's connection with the Marshal de Brissac terminated in 1560, when the civil wars in France had already begun, he probably returned immediately to Scotland, though the exact period has not been ascertained. He had courted, while he resided in France, the notice of Mary, future queen of Scots, by an Epithalamium on her marriage with the dauphin; and in January, 1561–62, we find Randolph, the English ambassador, writing thus from Edinburgh to his employers:—'Ther is with the quene [Mary] one called George Bowhanan, a Scottishe man very well learned, that was Schollemaster unto Monsr. de Brissack's son, very Godlye and honest.' And in a subsequent letter, dated from St. Andrews, he says, 'The quene readeth daylie after her dinner, instructed by a learned man, Mr. George Bowhanan, somewhat of Livy.' Buchanan took occasion to express his attachment to his royal pupil in a highly finished copy of Latin verses, prefixed to his translation of the Psalms, which he had just finished, and sent to the press of his friend Henry Stephens. Mary, in return for this compliment, and as a reward for his services, bestowed upon her preceptor and poet, in 1564, the temporalities of the abbey of Crossraguell. These temporalities, valued at £500 Scots a year, he seems to have held till the day of his death. Buchanan, however, sedulously cultivated the friendship of the leaders of the Reformation. In the same year in which he was promoted to the temporalities of Crossraguell, he prepared for the press a collection of satires, Fratres Fraterrimi, in which the fooleries and impurities of the Church were assailed with the keenest irony and the most vehement invective. He also put the finishing hand to his Franciscanus, which he published with a dedication to the Earl of Murray. Through the interest of this nobleman Buchanan was nominated to be principal of St. Leonard's College, St. Andrews, in 1566. Next year he was chosen moderator of the General Assembly, the only instance of the chair being held by a layman.

When Elizabeth thought fit to appoint commissioners and call witnesses from Scotland, for the purpose of substantiating the charges upon which Mary had been expelled from the throne, the main burden of the proof was devolved upon Buchanan. He accompanied the Regent Murray into England upon that occasion, having composed in Latin a Detection of Mary's actions, which was laid before the commissioners at Westminster, and was afterwards most industriously circulated by the English court. The assassination of the Regent Murray, soon after his return from England, threw the nation into a ferment, and Buchanan, strongly suspicious of the selfish policy of the Hamiltons, addressed 'Ane admonition direct to the true lordis maintainirs of the kingis graces authorite,' in which he earnestly adjured them to protect the young king and the children of the late regent from the perils that seemed to impend over them. The same year he composed a satirical delineation of the character of the secretary Lethington, entitled Chameleon, which through the vigilance of the secretary was prevented from being published at the time. A copy, however, was preserved among the Cotton MSS., dated 1570, and it was printed at London in 1710, in the Miscellanea Scotica. It has often been reprinted since. These two pieces appear to be all that he ever composed in his vernacular tongue, and they are of such excellence as to make it matter of regret that he did not turn his attention oftener to the cultivation of his native language. Buchanan was, in 1570, selected by the lords of the privy-council to take the superintendence of the education of King James; and the respectable scholarship which his pupil exhibited in after life shows that he executed his task with success. At this time he was also appointed director of the chancery; but this he does not appear to have long held. The same year he was made keeper of the privy seal. This office, both honourable and lucrative, and which entitled him to a seat in Parliament, he held for several

years. It was principally by his advice and that of Sir Alexander Erskine that Morton was deposed, and the reins of government put into the king's hands, when he was only in his twelfth year. He was a member of the privy-council appointed for the young monarch, but seems to have been displaced on Morton's return to power; and we are uncertain if he ever again held any political office.

In 1576 he prepared his Baptistes, and dedicated it to the young king, with a freedom of sentiment bordering upon disrespect. Three years after, in 1579, he published his compendium of political philosophy, entitled De Jure Regni apud Scotos, a work which will ever rank him among the spirited defenders of the rights of the people to judge of and control the conduct of their governors. He also compiled his life at the request of his friends, when he had reached his seventy-fourth year, and his epistolary correspondence, which was at one time very extensive, was still continued with some of the friends of his earlier days.

It is doubtful whether he lived to see his History of Scotland ushered fairly into the world or not. The dedication to the king is dated August the twenty-ninth, 1582, only thirty days before the death of the author, which happened on Friday, the 28th of Sept. following, when he had reached the age of seventy-six years and eight months. Notwithstanding the many public situations he held in his lifetime, such was the extent of his charities, that he died poor, and was buried at the expense of the city of Edinburgh, in the Gray Friars Churchyard, a great multitude attending his funeral. In 1584, two years after its publication, the history was condemned, along with De Jure Regni, by the Parliament of Scotland, and every person possessed of copies commanded to surrender them within forty days, in order that they might be purged of the offensive and extraordinary matters which they contained.

Buchanan during his life was a violent and often virulent partisan; and his character, therefore, has been differently estimated according to the political and religious views of the writers. As a Latin poet and historian, however, there can be but one opinion of his excellence. In the former department no modern Latinist has approached him in harmony and splendour of diction; in the latter department he is said to unite the beauties of Livy and Sallust as to style, though in other respects he shows a lack of judgment in taking up all the tales of old chronicles as he found them, and affording to their legendary absurdities the currency of his own eloquent embellishment. Perhaps, after all, it is as a political writer that the world is chiefly indebted to him, for he was among the first to combat the old axiom of the 'divine right of kings,' and to expound the true rights and privileges of the subject. Of Buchanan's works there are two collective editions, one by Ruddiman (Edinburgh, 1715, two vols. folio), and one by Burmann (Leyden, 1725, two vols. 4to). See his Life by Dr. Irving, second edition, Edinburgh, 1817, 8vo.

BUCHANAN, James, the fifteenth president of the United States of America, was born in Pennsylvania, 22d April, 1791; died in the same state on 1st June, 1868. His father was by birth an Irishman, who had quitted Europe in 1783, and established himself in a farm at Stony-Batter. James Buchanan was educated at Dickenson College, Carlisle, where he graduated; subsequently entered the office of James Hopkins of Lancaster to study law, and was admitted to the bar in 1812. In 1814 he was elected to the legislature of Pennsylvania, and in 1820 was sent to Congress, of which he continued a member till 1831, being re-elected four times. He then entered the career of diplomacy, being charged by President Jackson with a special mission to Russia for the conclusion of a commercial treaty. On his return, in 1833, he was elected to the Senate. About this time the anti-slavery agitation began to assume importance. Buchanan wished to prevent the agitation reaching Congress, by declaring its incompetency to deal with it. He held that constitutionally it was a question for the individual states, and that it was better for all parties, even for the slaves themselves, that it should remain so. Under the presidency of Polk, 1845–49, Buchanan was intrusted with the functions of secretary of state. The annexation of Texas and the war with Mexico were the chief events of his administration. During the presidency of General Taylor he retired from public life. In 1853 General Pierce, on being elected president, named him ambassador of the United States at London. He held this appointment till 1856. The Central American boundary and the project of the annexation of Cuba were the principal subjects discussed during his embassy. While maintaining with ability the views of his own country, he gained the esteem of that to which he was deputed by the prudence and moderate tone of his diplomacy. He returned to America in 1856, being chosen as candidate for the presidency by the Democratic party. He was elected by a large majority over Fremont, the Republican candidate, and inaugurated in March, 1857. His foreign policy inclined to the aggressive views he had always advocated, but the questions of slavery and state-rights were at this period approaching a crisis which made home administration of much greater importance. By his pro-slavery views, and the firmness and moderation of his character, Buchanan succeeded in delaying the storm which burst out on the election of his successor Lincoln. His character for statesmanship, however, suffered from his vacillation in dealing with the first measures of the seceders; but it must be considered that the position of a ruler holding office as the locum tenens of his successor is not favourable to a vigorous administration in a difficult crisis. He supported the administration of Lincoln, and lent his influence to the vigorous prosecution of the war.

BUCHANITES, a sect of enthusiasts who sprung up at Irvine, in the w. of Scotland, about the year 1783. Mr. White, the minister of a congregation of the Relief Church in that town, having been invited to preach in the neighbourhood of Glasgow, a female named Elizabeth Buchan, the wife of a painter, was captivated with his eloquence, and writing to him, announced that he was the first who had spoken to her heart, and requested permission to pay him a visit at Irvine, that the work of her conversion might be perfected. On her arrival she was joyfully received by the members of the congregation, engaged without intermission in religious exercises, went from house to house, conducted family worship, answered questions, resolved doubts, explained the Scriptures, and testified that the end of the world was at hand, and that it was the duty of every Christian to abandon the concerns of time and prepare for the reception of Christ. Mr. White, favouring her and her views, was complained of to the presbytery, by which he was deposed from his ministry. Thus a distinct party was formed, the meetings of which were commonly held at night, and on these occasions the new prophetess indulged in her reveries, styling herself the Woman of the Twelfth of Revelations, and Mr. White her first-born. Such gross outrage on the common sense of the inhabitants occasioned a popular tumult, to save her from the fury of which the magistrate sent her under escort to some distance; after which, with her clerical friend, and about forty deluded followers, she wandered up and down the country, singing, and avowing that they were travellers for the New Jeru-

salem, and the expectants of the immediate coming of Christ. They had a common fund on which they lived, and did not consider it necessary to work, as they believed God would not suffer them to want. Mrs. Buchan died in 1792, and the sect soon after broke up.

BUCHAREST, that is, 'city of joy,' formerly the chief city of Walachia, now the capital of the principality of Roumania, on the Dumbowitza, 37 miles from its mouth; lat. 44° 25′ N.; lon. 26° 5′ E. Besides being the seat of government, Bucharest is the residence of a Greek archbishop. The appearance of the town is very peculiar. In general it is meanly built, and the houses being surrounded with gardens gives it a rural appearance. The streets are narrow, crooked, and muddy, being without foot-paths or drains, and are almost impracticable for the foot passenger either in summer or winter; in the former he is suffocated with dust, in the latter he sinks in mud. The government has recently exerted itself to maintain them in a better state. The inhabitants nearly all belong to the Greek Church. The churches are very numerous, and divide the town into districts or parishes; there are 127 in all, eighty of which constitute districts. There is a mixture in the population of eastern habits with European civilization among the upper classes. Bucharest has a Greek high-school, a French college, a library with very rare and precious oriental manuscripts, and a museum of history and antiquities. There are a few fine public buildings, of which the most conspicuous is the palace of the prince; but that which chiefly distinguishes Bucharest is the magnificence of the public gardens, which rival those of the chief European capitals. Here are manufactures of cloths, carpets, bagging, bijouterie, &c. Bucharest is also the central depôt of the commerce of Walachia. It imports cloths, glassware, and hardware extensively from Germany; and exports grain, wool, honey, wax, tallow, and cattle, the produce of the country. In 1698, when it became the capital of Walachia, it was only a village. It was pillaged by the Servians in 1716; taken by the Russians in 1769 and 1806; occupied by them again in 1828–29 and 1853–54; by the Austrians in 1774, 1789, and 1854; was partly destroyed by fire in 1847; became the capital of Roumania in 1862; a peace congress was held there in 1772–73, and another in 1812. Pop. in 1867, 141,754.

BUCHAREST, Peace of, May 28, 1812, between Russia and the Porte. In November, 1806, the Emperor Alexander took up arms for the protection of Moldavia and Walachia, and on account of the violation of the free navigation of the Bosphorus. He occupied Moldavia, upon which the Porte declared war against Russia, January 7, 1807. An armistice, however, was agreed upon at Slobosia, August 24, 1807, in consequence of the Peace of Tilsit, by which the Russians evacuated the principality. After the expiration of the truce in April, 1808, it was tacitly continued; but when Napoleon, in the Congress at Erfurt, had agreed to the union of the two principalities with Russia, the Russian court opened a congress to deliberate upon peace at Jassy in February, 1809, and demanded the cession of both principalities by the Turks, and the removal of the British ambassador from Constantinople. Upon this the Porte broke off the negotiations, and in April, 1809, the war was renewed. The Russians advanced to Bulgaria, and after two bloody campaigns remained masters of the Danube. The Porte now offered terms of peace. A congress was opened at Bucharest in December, 1811. Napoleon soon after turned his arms against Russia, and concluded an alliance with Austria, March 14, 1812, by which both powers guaranteed the integrity of the Porte. He also did all in his power to induce the Porte to continue the war. But the interposition of Great Britain and Sweden, as well as the concessions of Russia, and the distrust of the Porte towards Napoleon, brought to a conclusion the Peace of Bucharest, which was signed, on the part of the Russians, by Andri Italinski, Sabanejeff, and Jos. Fonton, May 28. The Porte gave up to Russia all Bessarabia and a third of Moldavia, with the fortresses of Choczim, Bender, Ismail, and Kilia, so that the Pruth, as far as to its confluence with the Danube, became the boundary between the two powers, and from thence the left bank of the Danube as far as Kilia, and even to its entrance into the Black Sea. The Russians gave back the rest of their conquests. In Asia the boundaries were established as before the war. The boundary then settled between Russia and Turkey was modified in favour of the Porte at the Peace of Paris, 30th March, 1856. See Paris (Treaties of).

BUCHARIA. See Bokhara.

BUCHER, Anton von, a well-known and much esteemed Catholic writer against the Jesuits, was born in Munich, Jan. 8, 1746, educated in the Latin schools of the Jesuits, studied at Ingoldstadt, and was consecrated priest in 1768. He died in 1817. In his different offices as a public teacher he has done a great deal to instruct and enlighten his country. His contributions to the history of the Jesuits in Bavaria (Beiträge zur Geschichte der Jesuiten in Baiern) are of great historical value. His works were published in six vols., Munich, 1819, et seq.

BUCHEZ, Philippe Joseph Benjamin, French physician and writer, was born 31st March, 1796, at Matagne, then a village of the department of Ardennes. After finishing his education at Paris he gave himself up to the study of the natural sciences, and in particular to medicine, receiving his doctor's degree in 1825. He was bitterly hostile to the government of the restoration, and was one of those who, about 1820, founded the French society of Carbonari. He became chief editor of the Journal des Progrès des Sciences et Institutions Medicales, and in 1826 assisted in editing the Producteur, a weekly paper which advocated the doctrines of Saint-Simonism. As his views ceased to coincide with those of his colleagues, however, he withdrew from the Producteur, and in 1831 founded a journal of moral and political science, called L'Européen, in which he expounded those doctrines which owe their origin chiefly to himself, and have been collectively denominated 'Buchezism.' The fundamental idea of his system is that of the progress and development of the human race. Geology, physiology, history, all prove progress to be the universal law. But progress presupposes an aim or end, and this end cannot be left to chance; it must be pointed out beforehand, or, according to M. Buchez, *revealed*. Thus the idea of progress leads him to the orthodox belief in revelation. This theory is worked out in his Introduction à la Science de l'Histoire (Paris, 1833, 2d edition, 1842), and his Essai d'un Traité Complet de Philosophie au Point de Vue du Catholicisme et du Progrès (1839). This work enjoys great favour in the Catholic world, and has been used as a text-book of philosophy in some ecclesiastical schools. Along with his favour for the Catholic Church he still retained his strong democratic and republican opinions, and in concert with M. Roux-Lavergne published Histoire Parlementaire de la Révolution Française, ou Journal des Assemblées Nationales, depuis 1789 jusqu'en 1815 (forty vols. Paris, 1833–38). After the revolution of 1848 he was elected to the constituent National Assembly, of which he was soon appointed president. This post he did not retain beyond the disturbance of the 15th May, on which occasion he manifested the utmost weakness and indecision. Thenceforth he held aloof

from public life, prosecuting his studies and writing several works, among which we may mention Histoire de la Formation de la Nationalité Française (two vols. Paris, 1859). His death took place in Aug. 1865.

BUCHON, JEAN ALEXANDRE, a distinguished French historical writer, was born 21st May, 1791, at Ménetou-Salon, in the French department of Cher. Having gone to Paris, he became collaborateur on several liberal journals, and early took part in the opposition to the restoration. He was in consequence several times prosecuted by the government, and his writings, such as his Vie de Tasse (Paris, 1817), were interdicted. In 1821 he gave a course of lectures in the Athenæum on the history of dramatic art in England; and in the following years he travelled over the greater part of Europe for the purpose of collecting documents to illustrate the history of France during the middle ages. After his return he published his Collection des Chroniques Nationales Françaises, écrites en Langue Vulgaire du XIIIme au XVIme Siècle (forty-seven vols. Paris, 1824–29), which he began with the Chroniques de Froissart (fifteen vols. 1824–26). These chronicles were accompanied with biographical notices and with critical and other notes, as were also those which he edited for the Panthéon Littéraire. Among the latter are Chroniques Étrangères relatives aux Expéditions Françaises pendant le XIIIme Siècle (Paris, 1840). He was appointed inspector of the archives and libraries of France in 1828, and in 1829 inspector-general of the departmental and communal archives; but he soon lost his office through a change of ministry. The revolution of July (1830) did not reinstate him in his position, and he returned with new ardour to his historical and literary labours. He died April 30, 1846. In addition to the works of this indefatigable writer already mentioned, we may notice his Histoire Populaire des Français (Paris, 1832); La Grèce Continentale et la Morée (1843); and his Histoire des Conquêtes et de l'Établissement des Français dans les États de l'ancienne Grèce sous les Ville-Hardouin (1846), besides his editions of Brantôme, &c., and his articles in cyclopedias and magazines.

BUCK, the male of the fallow-deer, also of rabbits and other animals.

BUCK-BEAN, BOG-BEAN, or MARSH-TREFOIL (*Menyanthes trifoliata*), a beautiful British plant belonging to the Menyanthese, a subdivision of the natural order of the Gentianaceæ. It is common in spongy, boggy soils, and besides inhabiting Britain is found throughout Europe as well as in Siberia and North America. It flowers in Britain about the latter end of June. It has a procumbent stem rising to a height of 6 or 12 inches, and covered by the sheaths of the leaves, and a creeping jointed root. The leaves are trifoliate (like those of clover), with obtuse, ovate leaflets. The flower-stalk terminates in a thyrse of white flowers, rose-coloured outwardly. The calyx is five-parted, the corolla funnel-shaped, spreading, and clothed on the inner surface with a coating of dense fleshy hairs. The fruit consists of a one-celled, two-valved capsule containing numerous seeds. The whole plant, the root especially, has an intensely bitter taste, and an extract of it ranks as a valuable tonic quite equal in its effects to gentian. It is not so frequently employed now, however, as it used to be. It is said to be beneficial in intermittent fevers, gout, liver complaints, dropsy, scurvy, &c. In the N. of Europe it is sometimes used instead of hops to give bitterness to beer; and in Lapland an unpalatable kind of bread is made from the powdered roots.

BÜCKEBURG. See LIPPE.

BUCKETS, in water-wheels, are a series of cavities into which the water is delivered, on the circumference of the wheel to be set in motion. By the revolution of the wheel the buckets will be alternately erected so as to receive water and inverted so as to discharge it; the loaded side will descend, and present the empty buckets in succession to the current, and thus keep up a constant revolution of the wheel.

BUCKINGHAM, or BUCKS, an inland county, England, bounded N. and N.W. by county Northampton; N.E. and E. by counties Bedford and Hertford; S.E. by Middlesex, S.W. by county Berks, and W. by Oxford; its length, N. to S., is about 45 miles; greatest breadth, E. to W., 23 miles; area, 466,932 acres, of which 440,000 are supposed to be arable. The vale of Aylesbury, stretching through the centre of the county, and celebrated for its fertility, furnishes rich pasturage for vast numbers of cattle and sheep. The soil in this part of the county is a strong clay loam, varying in depth from 2 feet of rich staple, to only a few inches incumbent on stiff clay. But though well adapted for grazing, it is not considered suitable for tillage, and the portion, therefore, under the plough is very small. In this district the tenures are principally from year to year—a system which is looked upon with considerable favour by most of the tenants.

Agriculture is perhaps in a more backward state in this county than in some other English counties, but improved methods of culture, new implements, and artificial manures are now employed. The order of cropping is not very definite, but generally consists of what is called 'three crops and a fallow,' which begins with bare fallow, then wheat, then beans, pease, and clover, and last, wheat or barley. The total area under cultivation in 1871 was 398,150 acres, of which 207,460 acres were under corn or other rotation crops, and 184,271 under permanent pasturage. The farm accommodation generally, as to dwellings and outhouses, &c., though improving, is somewhat defective, the latter being constructed mostly of rough timber, and thatched, with little regard to form or situation. Drainage is becoming general. In the S. parts are rich dairy farms. The stock of cattle in 1871 was 57,826; of horses, used solely for agriculture, 15,906; and sheep, 266,281. Between 4,000,000 and 5,000,000 lbs., or about 1900 tons of butter, are annually made in this county, the greater part of which is sent by contract to London. Milk and cream cheeses are made for the London market, and large numbers of calves are sold. Hogs and ducks are reared in great numbers; the former more especially on the dairy farms, where they are fed on skim and butter milk. The fattening of cattle is almost wholly confined to the vale of Aylesbury.

The manufactures of Buckinghamshire are chiefly of thread lace, which furnishes employment to a great number of females and children; paper and straw plait. The former, however, has much declined since the rise of the machine lace manufacture of Nottingham. The mineral productions of this county are of no great importance. The county is watered by the Ouse, the Thame, and the Thames; and is intersected by the Grand Junction Canal, and the London and North-Western Railway, and by some branches of both. The county of Buckingham comprises eight hundreds. Those of Stoke, Burnham, and Desborough are known as 'Chiltern Hundreds.' It is mostly in the diocese of Oxford, and has 224 civil parishes. It has one court of quarter sessions, and twelve petty sessional divisions, besides two municipal boroughs, Buckingham and Chipping-Wycombe. It has three parliamentary boroughs, Aylesbury returning two members, and the two previously named one each. The parliamentary boroughs of Great Marlow and New Windsor lie partly in Buckinghamshire and partly in Berkshire. Bucking-

hamshire returns three members to the House of Commons. It gives the title of earl to the family of Hobart Hampden. Pop. in 1871, 175,879.

BUCKINGHAM, a parliamentary and municipal borough of England, capital of the county of its own name, 50 miles N.W. of London, on a branch of the London and North-Western Railway. It is pleasantly situated on a peninsula formed by the Ouse, which almost encompasses the town, and is here crossed by three stone bridges. The houses are mostly of brick; the streets straggling and irregular, paved, and lighted with gas. The town-hall and jail are large and commodious buildings. The church, erected in 1781, is a spacious structure, with a square tower, surmounted by an elegant spire; and there are, besides, places of worship for Independents, Wesleyans, and the Society of Friends; also a free grammar-school, founded by Edward VI.; and several alms-houses. The manufacture of lace, formerly carried on here to some extent, of late years has greatly declined. Malting and tanning are carried on to a considerable extent; and a good deal of business is done in wool and hops. In the vicinity are several limestone quarries, and one of marble. The borough formerly returned two members to the House of Commons, but was deprived of one of them by the reform act of 1867. There are numerous fairs, chiefly for horses, cattle, and sheep. Buckingham gives the title of duke to the family of Temple. Pop. in 1871, 3703.

BUCKINGHAM, GEORGE VILLIERS, DUKE OF, the unworthy favourite of James I. and Charles I. of England, was born, 1592, at Brookesby, in Leicestershire, of a family which came thither, from Normandy in the time of William the Conqueror. His father was George Villiers, Knight; his mother was descended from the ancient family of Beaumont. His father died when he was thirteen, and at eighteen years of age he was sent to France, where he resided three years, and acquired great skill in all bodily exercises. This, together with his beauty of person and graceful manners, made so great an impression on James I., who gave him the familiar name of Steenie, that in less than two years he was made a knight, a gentleman of the bed-chamber, baron, viscount, Marquis of Buckingham, lord high-admiral, lord warden of the Cinque Ports, &c., and at last dispenser of all the honours, offices, favours, and revenues of the three kingdoms, according to the dictates of his ambition, his cupidity, and his caprice. The nation was indignant at seeing merit undervalued, the people trampled upon, the nobility humbled, the crown impoverished and degraded, to elevate and enrich a weak and insolent favourite. Such rapid and undeserved promotion likewise caused many private jealousies, and his character was freely, and probably in some respects falsely aspersed. In 1623 he engaged in a romantic adventure with Charles, prince of Wales, in connection with which traitorous views have been attributed to him. The Earl of Bristol was negotiating a marriage for the prince with the Infanta of Spain. Buckingham persuaded the prince to go to Madrid and carry on his suit in person. They set out incognito, passed through various adventures, and saw on their way the Princess Henrietta Maria of France, whom Charles afterwards married. The result of this journey is well-known. The marriage was broken off, war declared with Spain, and Bristol was impeached. Buckingham was created a duke during his absence, and whatever misconduct may have been associated with the design or execution of his mission, his favour with the king and prince remained unimpaired. James died in March, 1625, and in May of the same year Buckingham was sent to France as proxy for Charles I., to marry the Princess Henrietta Maria. In the following year the unpopularity of the war with Spain, and the failure of the expedition to Cadiz, caused his impeachment, from the consequences of which he was saved by his favour with the king. His intrigues soon after brought on a war with France, and he was intrusted with an expedition to succour the Rochellese, but they refused his aid, and he carried his forces to the Isle of Rhé, where, after three months spent in unskilful operations, he suffered a defeat in re-embarking which cost 2000 men. Notwithstanding this proof of incapacity, a large force was again intrusted to him to renew the attempt on Rochelle. He went to Portsmouth to superintend the preparation, and while there he was assassinated, Aug. 24, 1628, by John Felton, a lieutenant who had withdrawn from the army in consequence of being disappointed of promotion.

BUCKINGHAM, GEORGE VILLIERS, DUKE OF, son of the preceding, was born at Wallingford House, in Westminster, Jan. 30, 1627. After studying at Trinity College, Cambridge, he travelled abroad, and on his return home, after the commencement of the civil war, he was presented to the king at Oxford. He served in the royal army, under Prince Rupert and Lord Gerard. His estate was seized by the Parliament; but having obtained the restoration of it, he travelled with his brother into France and Italy. In 1648 he returned to England, and was with Charles II. in Scotland, and at the battle of Worcester. He followed that prince abroad, and served as a volunteer in the French army in Flanders. He afterwards returned to England, and in 1657 married the daughter of Lord Fairfax, by which means he repaired the ruin of his fortune in the royal cause. He, however, preserved the favour of Charles II., and at the Restoration was made master of the horse. He also became one of the king's confidential ministers, who were designated by the appellation of the *cabal* (1667–73). His political conduct was, like his general behaviour, characterized by unprincipled levity and imprudence. In 1666 he engaged in a conspiracy to effect a change of the government; notwithstanding which, he recovered the favour of King Charles, which he repeatedly abused. The profligacy of his private life was notorious. He seduced the Countess of Shrewsbury, and killed her husband in a duel; and he was more than suspected of having been the instigator of the infamous Colonel Blood to his brutal outrage against the Duke of Ormond, whom he attempted, with the assistance of other ruffians, to carry to Tyburn, and hang on the common gallows. In 1676 he was, together with the Earls of Shaftesbury and Salisbury and Lord Wharton, committed to the Tower for a contempt, by order of the House of Lords; but, on petitioning the king, they were released. After plotting against the government with the Dissenters, and making himself the object of contempt to all parties, he died, neglected and unregretted, at Kirkby Moorside, in Yorkshire, April 16, 1688. Pope (Moral Essays, epistle 3d) has strikingly described his death. His abilities were far superior to those of his father; and among his literary compositions, the comedy of the Rehearsal may be mentioned as a work which displays no common powers, and which greatly contributed to the correction of the public taste, which had been corrupted by Dryden and others.

BUCKINGHAM, JAMES SILK, a noted traveller and lecturer, was the son of a seafaring man in the village of Flushing, near Falmouth, and was born there in 1786. He attended school at Falmouth, and having early manifested a great predilection for the sea, made three voyages to Lisbon while yet a mere

boy. On the last of these he was taken captive with the ship, and detained a prisoner for some time in Spain, but was ultimately liberated and returned to England. He then entered the employment of a bookseller and nautical instrument maker at Devonport, where he continued for three or four years; but at last, urged by a sudden whim, set off again to sea, and almost as quickly deserted and returned to his friends. He then betook himself to the study of law, but his fickle temper led him soon to abandon that also, and though not yet twenty years old, he got married, and set up a shop for the sale of books and nautical instruments. This also proved an unfortunate speculation, and the young adventurer proceeded to London in the hopes of obtaining an appointment on board a West Indiaman, which he at last succeeded in doing; but while waiting for it had to work as a printer in order to support himself and make remittances to his wife and child. As captain or chief officer he made several voyages to the West Indies, and afterwards quitted this line for a similar employment in the Mediterranean trade. He then resolved to settle at Malta as a ship-owner and merchant, but this project was frustrated by adverse circumstances, and he set off to try his fortunes in Egypt. He succeeded in obtaining from Mohammed Ali a commission to examine the isthmus of Suez, and report on the practicability of carrying a canal through it from the Red Sea to the Mediterranean. Nothing definite was accomplished in this matter, and the pasha then gave Buckingham a commission to purchase ships for him in India, and encourage a trade between that country and Egypt. With this view he proceeded to Bombay, and arrived there in 1815, but found strong prejudices existing against Mohammed Ali, and an unwillingness to have anything to do with him, and he accordingly accepted the command of a ship belonging to the Imaum of Muscat, with the view of trading to China on behalf of that potentate. On this intention becoming known to the authorities at Bombay, and also the circumstance that he had no license from the East India Company to reside in India, he received orders to return to England, but after considerable difficulty was at last allowed to return to Egypt in one of the Company's ships. Here he had another interview with the pasha, who furnished him with a firman and other assistance, by means of which he effected an overland journey to India, through Syria, Mesopotamia, and Persia. In 1816 he established a journal in Calcutta, but the censorship of the press was then in full force in India, and Buckingham, having offended government by the boldness of his animadversions, his printing-presses were seized, and he himself compelled to quit the presidency of Bengal and return to England. On his arrival there a subscription was set on foot to reimburse him for the losses which he had sustained by the proceedings of the Indian government, and about this time he began to deliver lectures in London on behalf of free-trade to the East, and the extinction of the East India Company's monopoly. He also established the Athenæum—well known as a literary journal—and prepared for the press the manuscript journals of his travels. In 1822 appeared Travels in Palestine; in 1825, Travels in Arabia; in 1827, Travels in Mesopotamia; and in 1830, Travels in Assyria and Media. In 1832 he was chosen member of Parliament for Sheffield, and retained his seat till 1837. Subsequently to this he made a tour of three years in America, resulting in the publication of eight volumes on the United States, and one on British North America. A great part of these is occupied by statistics and other ponderous matter—a circumstance which is generally characteristic of Buckingham's books of travel. In 1843 he became secretary to the British and Foreign Institute—a literary club which he had mainly contributed to form; but in this capacity he unfortunately drew upon himself the animadversions of Punch, which at last fairly extinguished the society. In the later years of his life his principal occupation was delivering lectures in various parts of the country, and, from his choice of subjects and popular and pleasing style, they were attended with considerable success. He was a zealous promoter of the temperance cause, and president of the London Temperance League. In 1849 appeared his National Evils and Practical Remedies. He has also published two vols. on Belgium, the Rhine and Switzerland, and two on France and Piedmont, the results of tours on the Continent. His last work was his Autobiography, the first two vols. of which appeared in 1855, but its completion was prevented by the author's death on 30th June of that year. A few years before his death the East India Company granted him a pension, which was afterwards continued to his widow, and he had also a pension of £200 a year from the civil list.

BUCKINGHAM PALACE. See London.

BUCKLAND, Rev. William, D.D., an eminent geologist, was born at Axminster in Devon, in 1784, and was educated first at Winchester, and afterwards at Corpus Christi College, Oxford. He took his degree of B.A. in 1803, and obtained a fellowship in 1808. From early childhood he had been familiar with the ammonites and other fossils in the lias quarries near his native town, and with advancing years the bent of his mind to geological pursuits was developed and confirmed. In 1813 his known abilities in this department procured him the appointment of reader in mineralogy at Oxford, and so well did he maintain and extend his reputation, that in 1818 a new readership, that of geology, was bestowed on him, having been expressly instituted on his behalf. In 1820 he delivered before the University of Oxford a lecture, which was afterwards published under the title of Vindiciæ Geologicæ, or the Connection of Religion with Geology Explained. In the course of his geological rambles throughout England his interest had been largely excited by the examination of the deposits of animal remains in caves in various parts of the country. To these he was the first to direct public attention; and on the discoveries then made by him, and the disclosures thereby afforded of the animals inhabiting our island in the pre-historic era, the fame of Dr. Buckland as a geologist more especially rests. A paper contributed by him to the Philosophical Transactions in 1822, entitled, Account of an Assemblage of Fossil Teeth and Bones of Elephant, Rhinoceros, Hippopotamus, Bear, Tiger, and Hyæna, and Sixteen other Animals, discovered in a Cave at Kirkdale, Yorkshire, in the Year 1821, procured for him the Copley medal; and on this was subsequently founded his Reliquiæ Diluvianæ, or Observations on the Organic Remains attesting the Action of an Universal Deluge, published in 1823. In 1825 he was presented by his college to the living of Stoke Charity, near Whitchurch, Hants, and the same year became one of the canons in the Christchurch Cathedral, Oxford. He also about this time married Miss Mary Morland, of Abingdon. In 1832 he acted as president at the second meeting of the British Association for the Advancement of Science, and read numerous papers before that body at different times. Dr. Buckland was one of the eight selected to write the celebrated Bridgewater Treatises, and in 1836 his essay was published, under the title of Geology and Mineralogy considered with Reference to Natural Theology. On the recommendation of Sir Robert Peel he was made, in 1845, Dean of Westminster, and in 1847 was appointed one of the trus-

tees of the British Museum. About 1849 he began to exhibit symptoms of mental aberration, which terminated in a hopeless imbecility. He died at Clapham, near London, on 14th August, 1856. Besides the works above indicated, he contributed an immense number of papers to various societies and periodicals. A memoir of him has been written by his son, and prefixed to an edition of his Bridgewater Treatise. He was a fellow of the Geological Society from 1813, and of the Royal Society from 1818.

BUCKLE, HENRY THOMAS, an eminent historical writer, was born on 24th November, 1822. He was the son of a wealthy merchant, and received his education partly at home, and partly at Dr. Halloway's School, Gordon House, Kentish Town. His delicate health prevented his remaining long at school, but his love of learning and indefatigable industry as a student supplied any deficiencies in his training, and he was to a great extent self-educated. At an early age he entered his father's counting-house, but he displayed no aptitude for business; and when at the age of eighteen his father's death left him an ample fortune, he devoted himself entirely to study. The only thing he allowed to distract him from his more serious pursuits was his favourite game of chess, in which he attained such excellence as to be recognized as one of the first English masters of the game; but even this he gave up when he found it encroached too much on his time. He had formed a plan, to which he dedicated his life, of writing the History of Civilization in England in conformity with certain philosophical principles, and with an exhaustive treatment in regard to details which he deemed indispensable to historical accuracy, which made the work he had undertaken one of almost incalculable magnitude. He only succeeded in finishing two volumes; the first, published in 1858, stated with copious illustrations the plan of the work; the second, issued in 1861, contained a digression on the histories of Scotland and Spain, intended further to illustrate his design, and demonstrate the principles on which it was based. These works gave rise to much controversy, but it has been generally agreed that they exhibit great boldness and originality of design, with profound and accurate scholarship, and possibly also with a good deal of what was the object of the historian's strongest aversion in others, dogmatism. He died at Damascus on 29th May, 1862, when on a voyage undertaken for the restoration of his health.

BUCKLER. See SHIELD.

BUCKTHORN (*Rhamnus catharticus*), a shrub native of Britain, usually found in woods and hedges near running waters. The stem is covered with a dark brown bark, and divides into numerous branches with strong spines. It grows to 7 or 8 feet. The leaves are elliptical and serrated. The male and female flowers are on different plants. The calyx is of a greenish yellow. There is no corolla. The fruit is a round black berry, containing four seeds. It flowers in May, and the seeds ripen in September. The berries are medicinal. They form a powerful purgative, but being harsh in action are seldom used in modern practice. The juice of the ripe berries, mixed with alum, forms the sap-green of artists. The bark yields a beautiful yellow dye.

BUCKWHEAT, or BRANK (*Polygonum fagopyrum*), a plant of the order Polygoneæ, with branched herbaceous stem, somewhat arrow-shaped leaves, and purplish-white flowers, growing to the height of about 30 inches, and bearing a small triangular grain of a brownish-black without and white within. The stalk is round and hollow, generally green, but sometimes tinged with red. It is jointed, with lateral branches growing out at the joints. Buckwheat was first brought to Europe from Asia by the Crusaders, and hence in France is often called Saracen corn. It is cultivated in China and other eastern countries as a bread corn. It is sown here in May or June, and ripens rapidly, thriving in the poorest soil. The flowers appear about July, and the seeds ripen in October; but so tender are the plants that a single night's sharp frost will destroy a whole crop. As a grain, buckwheat has been principally cultivated for oxen, swine, and poultry; and although some farmers state that a single bushel of it is equal in quality to two bushels of oats, others assert that it is a very unprofitable food. Mixed with bran, chaff, or grain, it is sometimes given to horses. The flour of buckwheat is occasionally used for bread, but more frequently for the thin cakes called *crumpets*. In Germany it serves as an ingredient in pottage, puddings, and other food. In Pennsylvania it is very extensively used throughout the winter in cakes, which are cooked upon a gridiron. Beer may be brewed from it, and by distillation it yields an excellent spirit. It is used extensively in Danzig in the preparation of cordial waters. The best mode of harvesting this grain is said to be by pulling it out of the ground like flax, stripping off the seeds with the hand, and collecting these into aprons, or cloths tied round the waist. Buckwheat is much cultivated by the preservers of game as a food for pheasants. If left standing it affords both food and shelter to the birds during winter. With some farmers it is the practice to sow buckwheat for the purpose only of ploughing it into the ground as a manure for the land. The best time for ploughing it in is when it is in full blossom, allowing the land to rest till it decomposes. Whilst green it serves as food for sheep and oxen, and mixed with other provender it may also be given with advantage to horses. If sown in April two green crops may be procured during the season. The blossoms may be used for dyeing a brown colour. It is frequently cultivated in the Middle United States of America and also in Brabant, as food for bees, who are very fond of it, and to whose honey it imparts a flavour by no means unpleasant. The principal advantage of buckwheat is that it is capable of being cultivated upon land which will produce scarcely anything else, and that its culture, compared with that of other grain, is attended with little expense.

BUD. Buds are bodies of various form and structure, which develop upon different parts of vegetables, and which contain the rudiments of future organs, as stems, branches, leaves, and organs of fructification. The usual form of a bud is an elongated ovoid. Upon the branches of trees they are always developed in the axils of the leaves. Besides the rudimentary organs found in the interior, buds are in cold or temperate climates covered externally with a viscous and resinous coating, and furnished internally with a downy tissue, destined to defend the inclosed organs from the rigour of winter. No envelopes of this kind are observed on the buds of the greater number of tropical plants, which are consequently unable to live in colder countries. Buds on exogenous plants are in their commencement cellular prolongations from the medullary rays, which force their way through the bark. The cellular portion is surrounded by spiral vessels, and covered with rudimentary leaves. When the vascular part of the bud develops the central cellular portion remains as pith, inclosed in a medullary sheath, which isolates it from the parent stem. Thus it remains till the second year. The bud here described, which contains the rudiments of future leaves, branches, &c., is called a leaf-bud. In general, a single bud is developed each year in the axil of each leaf. There is

BUDGELL, EUSTACE, an ingenious writer, was born at St. Thomas, near Exeter, about 1685, and educated at Christ Church, Oxford; after which he went to London, and was entered of the Inner Temple, where his inclinations led him to neglect his profession, and study polite literature. He was a relative of Addison, who, in 1717, when principal secretary of state in England, procured for Budgell the place of accountant and comptroller-general of the revenue in Ireland. He lost these places when the Duke of Bolton was appointed lord-lieutenant, in 1718, by a lampoon on his grace. He then returned to England, where, in 1720, he lost £20,000 by the South Sea bubble. He afterwards tried to get into Parliament, and spent £5000 more in unsuccessful attempts, which completed his ruin. In 1727 the Duchess-dowager of Marlborough gave him £1000 for the purpose of getting him into Parliament; but his attempts were ineffectual. In 1733 he commenced a weekly paper, called the Bee, which was very popular. On the death of Dr. Tindal, the author of Christianity as Old as the Creation, £2000 was left to Budgell by his will. This sum was so disproportionate to the testator's circumstances, and the legacy so contrary to his known intentions, that suspicions arose respecting the authenticity of the testament; and upon its being contested by his nephew, it was set aside. Ruined in fortune and character, he ended his life by throwing himself into the Thames, May 4, 1736. He wrote the papers in the Spectator signed X.; also in the Guardian, &c.

BUDGET, in the parliamentary language of Britain, means the plan of taxation for the ensuing year proposed by government, and comprehends a general view of the national debt, income and expenditure, ways and means of raising supplies, &c., with the actual product of the preceding budget. It is brought forward by the chancellor of the exchequer. The term has been adopted by various other countries.

BUDISSIN. See BAUTZEN.

BUDWEIS, a city of Bohemia, 75 miles S. of Prague. It is well built, and has a cathedral and episcopal palace, a handsome town-house, a theological school, and a fine market-place lined with arcades. It has a flourishing trade, and manufactures of earthenware, cloth, machinery, &c. Pop. on the 31st of Dec. 1869, 17,413.

BUENAVENTURA, a seaport, New Granada, on the Bay of Choco, on a small island at the mouth of the Dagua, 200 miles W. by S. of Santa Fé de Bogota. It is the port of Santa Fé de Bogota, Popayan, and Cali.

BUEN AYRE, or BONAIR, a small island off the coast of Venezuela, belonging to the Dutch, 50 miles in circumference, inhabited chiefly by Indians, with a small mixture of Europeans; mountainous; producing a few cattle, goats, large quantities of poultry, and a considerable quantity of salt. It has springs of fresh water. On the S.W. side is a good harbour and road. Pop. 4000.

BUENOS AYRES, one of the fourteen provinces of the Argentine Republic (La Plata), lying W. of the La Plata and Atlantic Ocean, and separated from Patagonia by the Rio Negro. The province presents nearly throughout level or slightly undulating plains, known as the *pampas* of Buenos Ayres. They are covered with tall waving grass, which affords pasture to vast numbers of cattle and wild horses. These constitute the chief wealth of the inhabitants; and their products (hides, horns, tallow, beef) are the chief exports. The climate is generally healthy. Pop., according to the census of 1869, 495,107.

BUENOS AYRES, or NUESTRA SENORA DE BUENOS AYRES, a city of South America, capital of the above province, and of the Argentine Confederation, on the S.W. side of the La Plata, 150 miles from its mouth. Lon. 58° 23′ W.; lat. 34° 36′ S. The population in 1869 was 177,787. About one-fourth of the inhabitants are whites; the rest are Indians, negroes, and mixed breeds. The situation is agreeable and healthy, and the city derives its name from the salubrity of its climate. The temperature is nearly the same throughout the year. Until 1867 epidemic diseases were unknown in Buenos Ayres, but in that year cholera was introduced into the town from the scene of war in Paraguay, and many fell victims to it. A still more terrible epidemic visited the town in 1871. From the 6th of January to the month of June in that year, Buenos Ayres was devastated by the yellow fever, and the number of persons who were carried off by it is variously stated at from 16,000 to 30,000. The city is built with great regularity, the streets uniformly crossing each other at right angles. They are broad, spacious, and now pretty well paved. The houses are mostly built of brick, with flat roofs, many of them of two stories, though the greater part of only one. Buenos Ayres contains a palace, a town-hall, two public and three private hospitals, a cathedral, several monasteries, nunneries, and Catholic and Protestant churches, a theatre, custom-house, lunatic asylum, foundling hospital, and orphanage. The three private hospitals belong respectively to the English, French, and Italians; a German one is about to be built. Some of these public buildings are large and splendid. There are a college with a library of 30,000 volumes and an excellent museum, a normal and other schools, and several literary and scientific societies. Another institution worthy of mention is the Asylum for Immigrants, in which, in 1869, 7000 persons were received and maintained until suitable employment was found for them. As the present one is found to be insufficient for the yearly increasing number of immigrants, it was determined in 1871 to erect a new one. There is no harbour at Buenos Ayres, and large vessels can only come within 8 or 9 miles of the town, where they unload their goods into boats. Since 1856 two moles, the Muelle de la Capitania del Puerto, and the Muelle de la Aduana, have been built, which have greatly improved the anchorage, but the want of an artificial harbour is still much felt. The plan of such a harbour was laid out so early as 1826, and about the middle of 1870 its construction was begun. The environs of this city are well cultivated, furnishing all the necessaries of life in abundance, except wine, which is brought from Spain or from Mendoza. The inhabitants have country houses there called *quintas*. Wood is very dear at Buenos Ayres and at Monte Video. In the neighbourhood of these places are only some little shrubs hardly fit for fuel. All timber for building houses, and constructing and re-fitting the vessels that navigate in the river, comes from Paraguay in rafts. The city is the seat of a bishop, and has a trade in wool, ox-hides, and tallow, which are disposed of principally to Britain and the United States. The Germans and the Dutch likewise trade with Buenos Ayres. Much of the commerce of Brazil, Chili, Peru, and Paraguay is also carried on through the city. The great increase that has taken place of late years in the trade of Buenos Ayres is shown by the fact that while in 1860 the customs yielded only 3,000,000 dollars (£600,000) in 1870 they yielded 14,317,449 dollars (£2,863,489), and that in 1870 there were six banks in the town with branches in different provinces, against only one bank in 1860. In 1870, 1154 sailing vessels entered the port, and 1074 cleared. Buenos Ayres was founded in 1535 by Don Pedro de Mendoza, but being destroyed by the Indians it was colonized a

second time in 1580. In 1776 it became capital of the viceroyalty of La Plata, and it has always played a chief part in the history of the La Plata states. In 1806 Buenos Ayres was conquered by an English squadron under the command of Admiral Popham and General Beresford. Soon after, the inhabitants, having recovered from their terror, attacked the British by surprise and made a great slaughter among them. In the following year Whitelock and Crawford came over with reinforcements. They were quietly permitted to enter the city, and were then attacked with such fury that a third part of their number was destroyed, and the remainder were glad to conclude a truce.

BUEN RETIRO, a royal summer residence on an elevated ground near Madrid, built with much splendour by the Duke of Olivarez at the beginning of the seventeenth century. It has a theatre, park, and some valuable pictures. On the 5th of Dec. 1808, when the French attacked Madrid, it was the centre of the conflict, and was plundered. The French afterwards fortified it and used it as a citadel.

BUFFALMACCO, or Buonamico di Cristofano, a Florentine painter of the first half of the fourteenth century, studied under Andrea Tafi, but abandoned the dry and timid manner of that master and made Giotto his model. The best of his paintings have perished, but several of great merit still exist at Arezzo and Pisa. His talent was not confined to painting, and the excellence of a sonnet which he wrote at the bottom of one of his paintings gives cause for regret that he did not more frequently cultivate the muse. His ready wit, for which also he was remarkable, has enabled Vasari to write a very amusing account of his life.

BUFFALO, a town, United States, New York, capital of the county of Erie, at the E. extremity of Lake Erie, where the Niagara issues from it, and on the New York Central, and various other lines of railway; lat. 42° 53′ N.; lon. 78° 55′ W. Pop. in 1820, 2095; in 1860, 85,500; and in 1870, 117,714. It consists principally of wide and straight streets, which cross at right angles, but partly also of others, which meet the main street obliquely and prevent monotony of aspect. The whole site is a plain, with a gentle descent towards the lake, and well covered with houses, except in a few localities, where open spaces or squares have been left for ornament and ventilation. The climate is said to be more equable than that of any other place within the States of the same latitude, and this, combined with an admirable system of sewerage, has proved so conducive to health that the yearly mortality is only two per cent. The principal public buildings are a large and handsome edifice erected by the general government, and containing a court-house, custom-house, and post-office; four excellent market-houses, and numerous churches, among which particular notice is due to the Episcopal churches of St. John and St. Paul—the former built in a kind of transition style from the early English to the Gothic, the latter remarkable for its picturesque appearance and the variety of its outlines—and to the Roman Catholic cathedral, an imposing structure of decorated Gothic, flanked on its E. front with two towers, and adorned with a window of stained glass from Munich. The other buildings and institutions of note are Buffalo University, occupying a fine building, a liberally endowed and flourishing female academy, a young men's literary association, with a library of above 9000 volumes; an orphan asylum; a general hospital, and a fine cemetery, situated in the suburbs, and covering about 76 acres. Manufactures are numerous, and produce annually to an amount exceeding £2,000,000. The trade, greatly favoured by the harbour, which by means of breakwaters has been rendered safe and capacious, and by the various railways, is largely developed. The chief articles are flour and grain. The shipment of grain from Buffalo in 1871 consisted of wheat, rye, corn, barley, and oats, amounting in all to 48,184,991 bushels, as against 29,431,831 bushels the previous year.

BUFFALO, the name given to those species of ox which have a thickset body, a large thick head, pendent ears, and immense and widely extended horns, which are generally compressed at the sides and turned first downwards and then upwards, and which are sometimes also marked by irregular rings, or covered with protuberances. They are remarkable for their wildness, their strength, and their cunning. The Cape buffalo (*Bos Caffer*) is the most remarkable of these animals. It is very large, strong, and wild, and it is especially distinguished by its horns, which become very thick at the roots, where they appear like two immense swellings, which almost meet above the middle of the skull. In colour it is very dark, almost black, sometimes however inclining to brown. It takes its name from the Cape of Good Hope, where it is found, but it is not confined to this quarter, being also found in the great forests of the interior. In the woods lying to the S. of Kordofan they often appear in great numbers. They are extremely savage in disposition, and on that account are more feared by the tribes dwelling near their haunts than even the lion or the elephant. A Cape buffalo will sometimes hide himself behind trees watching till either man or beast approaches, then will suddenly dart out and attack his victim; and he is not content when he has killed him, but will crush him under his hoofs and tear him with his horns, and will even return after he has once left him, and attack him with renewed fury. At the same time he is so swift that unless a person is well mounted, there is no chance of escaping him, and even then one is in great danger unless an elevated part can be reached, where the pursuer cannot follow so fast. The hide of the Cape buffalo is so thick that it offers considerable resistance to a musket ball, and can be pierced by one only when it is fired from no great distance. These animals are generally found in herds, sometimes greater and sometimes smaller. Livingstone mentions herds of sixty, and Gordon Cumming saw herds of from six to about 800. They are often accompanied by a bird, which both frees them from vermin and warns them of the approach of danger by flying up into the air. In the south of Africa the bird which attaches itself to the buffalo in this way is the *Textor erythrorhynchos;* in the north it is a small kind of heron of a pure white colour called *Ardeola bubulcus*. In spite of the savageness of this species of buffalo when in a wild state, it is capable of being tamed, and when well treated exhibits a great deal of good nature.

In India also there are still several varieties of the wild buffalo, from one of which the tame buffalo frequently seen in Italy and Hungary is supposed to be derived. Of the Indian buffaloes the largest is the Arnee, which, though not yet very well known, is said to be the largest of its kind. It is 7 feet high at the shoulders, and from 9 to 10½ feet long from the muzzle to the root of the tail. Its colour is like the former, a very dark brown, almost black. This species also is very savage when in a wild state, but capable of being tamed, when it becomes sufficiently docile. In India and the Eastern Peninsula many animals of this species are said to be used both for riding and for agricultural purposes.

The common buffalo (*Bos bubalus*, or *Bubalus vulgaris*), by many considered a variety of the arnee, is also a native of India. Its horns are large, thick at

the roots, but gradually become thinner. The sides are compressed, only a third part at the end being rounded; from the roots to about the middle they are furrowed on the surface in front, but behind and at the ends they are almost quite smooth. The hair of the common buffalo is thin, stiff and bristly, and elongated at the shoulders and the neck in front, as well as on the forehead and at the extremity of the tail. The crupper, the breast, the under part of the body, and the greater part of the legs are quite naked. Its senses of smell and hearing are remarkably acute, but its sight is not so good. It is a formidable enemy of the tiger, and in contests with this animal is almost always victorious. It is one of the favourite spectacles of the Indian princes to witness a fight between two of these animals which have been brought together for the purpose. Hot, marshy districts are best adapted to the constitution of the buffalo. The Delta of the Nile is a paradise for him, and in the pestilential air of the Pontine Marshes, as well as in the marshy districts of Calabria and Apulia, in the Maremma of Tuscany, and the countries of the lower Danube, he is quite at home. In Italy he is almost the only domestic animal. In Lower Egypt he is common everywhere as a domestic animal, and yields excellent milk and butter. The animal called buffalo in America (*Bos Americanus*) is properly a bison, and is described under that name.

BUFFET, anciently a little apartment, separated from the rest of the room, for the disposing of china, glass, &c. It is now a piece of furniture in the dining-room, called also a sideboard, for the reception of the plate, glass, &c. In France many mansions have a detached room called *buffet*, decorated with pitchers, vases, fountains, &c. The word is now very commonly applied to the space set apart for refreshments in public places.

BUFFIER, Claude, a writer of considerable eminence, born in Poland of French parents in 1661, was brought up at Rouen, became a Jesuit, and for some time occupied a chair of theology, and died at Paris in 1737. Among his works, which are generally characterized by elegance of style, and deep, original thought, is a Traité des Premières Vérités, which proves him to have been an able metaphysician, and is much praised by Dugald Stewart.

BUFF LEATHER, a kind of leather which is prepared by saturating the hides with some aluminous substance, and afterwards with oil. Leather prepared in this way is softer and more flexible than any other kind of leather, and on that account it is much used for soldiers' cross-belts, gloves, and other military accoutrements. Its colour is naturally light yellow, but it is in some cases bleached before being used. The buff leather which was used in former times to make the jerkins which were worn under coats of mail to deaden the pressure of the metal on the body, and to prevent any contusion from a blow, was made from the hide of the urus, or wild bull of Central Europe, the common name of which was *buffe*, from which the name of the leather was derived.

BUFFON, George Louis Leclerc, Count de, one of the most celebrated naturalists and authors of the eighteenth century, was born at Montbard, in Burgundy, 1707, and received from his father, Benjamin Leclerc, counsellor to the parliament of his province, a careful education. Chance connected him at Dijon with the young Duke of Kingston, whose tutor, a man of learning, inspired him with a taste for the sciences. They travelled together through France and Italy, and Buffon afterwards visited England. In order to perfect himself in the language without neglecting the sciences, he translated Newton's Fluxions, and Hales' Vegetable Statics. After some time he published some works of his own, in which he treated of geometry, natural philosophy, and rural economy. He laid his researches on these subjects before the Academy of Sciences, of which he became a member in 1733. The most important were on the construction of mirrors for setting bodies on fire at a great distance, as Archimedes is said to have done, and experiments on the strength of different kinds of wood, and the means of increasing it, particularly by removing the bark of the trees some time before felling them. Buffon, in his earlier years, was animated only by an undefined love of learning and fame, but his appointment as superintendent of the Royal Garden (now the Jardin des Plantes), in 1739, gave his mind a decided turn towards that science in which he has immortalized himself. Considering natural history in its whole extent, he found no works in this department but spiritless compilations and dry lists of names. There were excellent observations indeed on single objects, but no comprehensive work. Of such a one he now formed the plan, aiming to unite the eloquence of Pliny, and the profound views of Aristotle, with the exactness and the details of modern observations. To aid him in this work, by examining the numerous and often minute objects embraced in his plan, for which he had not the patience nor the physical organs requisite, he associated himself with Daubenton, who possessed the qualities in which he was deficient; and after an assiduous labour of ten years, the two friends published the three first volumes of the Natural History, and, between 1749 and 1767, twelve others, which comprehend the theory of the earth, the nature of animals, and the history of man and the viviparous quadrupeds. The most brilliant parts of them, the general theories, the descriptions of the characters of animals, and of the great natural phenomena, are by Buffon. Daubenton limited himself to the description of the forms and the anatomy of the animals. The nine following volumes, which appeared from 1770 to 1783, contain the history of birds, from which Daubenton withdrew his assistance. The whole shape of the work was thus altered. Descriptions, less detailed, and almost entirely without anatomy, were inserted among the historical articles, which at first were composed by Guéneau de Montbeillard, and afterwards by the Abbé Bexon. Buffon published alone the five volumes on minerals, from 1783 to 1788. Of the seven supplementary volumes, of which the last did not appear until after his death in 1789, the fifth formed an independent whole, the most celebrated of all his works. It contains his Epochs of Nature, in which the author, in a style truly sublime, and with the triumphant power of genius, gives a second theory of the earth, very different from that which he had traced in the first volumes, though he assumes at the commencement the air of merely defending and developing the former. This great labour, with which Buffon was occupied during fifty years, is, however, but a part of the vast plan which he had sketched, and which has been continued by Lacépède in his history of the different species of cetaceous animals, reptiles, and fishes, but has remained unexecuted as far as regards the invertebrate animals and the plants. There is but one opinion of Buffon as an author. For the elevation of his views, for powerful and profound ideas, for the majesty of his images, for noble and dignified expression, for the lofty harmony of his style in treating of important subjects, he is perhaps unrivalled. His pictures of the sublime scenes of nature are strikingly true, and are stamped with originality. The fame of his work was soon universal. It excited a general taste for natural history, and gained for this science the favour and protection of nobles and princes. Louis XV.

raised the author to the dignity of a count, and D'Argivilliers, in the reign of Louis XVI., caused his statue to be erected, during his life, at the entry of the Royal Cabinet of Natural Curiosities, with the inscription 'Majestati naturæ par ingenium.' The opinions entertained of Buffon as a natural philosopher and an observer have been more divided. Voltaire, D'Alembert, Condorcet, have severely criticized his hypotheses and his vague manner of philosophizing from general views. But although the views of Buffon on the theory of the earth can no longer be defended in detail, he will always have the merit of having made it generally felt, that the present state of the earth is the result of a series of changes which it is possible to trace, and of having pointed out the phenomena which indicate the course of these changes. His theory of generation has been refuted by Haller and Spallanzani, and his hypothesis of a certain inexplicable mechanism to account for animal instinct is not supported by facts; but his eloquent description of the physical and moral development of man, as well as his ideas on the influence which the delicacy and development of each organ exert on the character of different species of animals, are still of the highest interest. His views of the degeneracy of animals, and of the limits prescribed to each species by climates, mountains, and seas, are real discoveries which receive daily confirmation, and furnish to travellers a basis for their observations, which was entirely wanting before. The most perfect part of his work is the History of Quadrupeds; the weakest, the History of Minerals, in which his imperfect acquaintance with chemistry and his inclination to hypothesis have led him into many errors. His last days were disturbed by the painful disease of the stone, which did not, however, prevent the prosecution of his great plan. He died at Paris, April 16, 1788, at the age of eighty-one years, leaving an only son, who perished in the revolution by the guillotine. Buffon was of a noble figure, and of great dignity of manners. His conversation was remarkable for a simplicity which strikingly contrasted with the style of his writings. The best edition of his Natural History is that published from 1749 to 1788, in thirty-six vols.

BUFFONE (Italian), buffoon; a comic singer in the *opera buffa*, or the Italian *intermezzo*. The Italians, however, distinguish the *buffo cantante*, which requires good singing, from the *buffo comico*, in which there is more acting. *Buffoonery* is the name given to the jokes which the buffoon introduces. The word is no doubt borrowed from the Low Latin, in which the name *buffo* (cheeked) was given to those who appeared on the theatre, with their cheeks puffed up, to receive blows on them, and to excite the laughter of the spectators. Afterwards the name came to signify a mimic, a jester in general.

BUG, or Boo (anciently *Hypanis*), a river which rises near the confines of Volhynia, in the N.W. of gov. Podolsk, and proceeds first E. and then S.E. through that gov. to Oliviopol, where it enters gov. Kherson, which it traverses almost centrally from N. to S., and falls into the estuary of the Dnieper, near Kherson. Its chief affluents are the Ingul, Balta, Tchertal, and Solonicha. The chief towns on its banks, besides those mentioned, are Bratslav, Voznesensk, and Nikolaev. It has a course of above 400 miles, but its navigation is greatly obstructed by rocks and sandbanks. There is another Bug in Russian Poland, a tributary of the Vistula, into which it falls about 20 miles N.N.W. of Warsaw. It is navigable for nearly 300 miles.

BUG (*Cimex Lectularius*), a well-known and most annoying insect, of a flat shape and rust colour, furnished with two horns, six legs, and a long sharp proboscis. The female deposits from twelve to fourteen eggs, which hatch in from five to twelve days. The young, at first transparent and white, change to red on being filled with blood. The best remedy is to wash infested furniture with a solution of corrosive sublimate, or spirits of turpentine.

BUGEAUD DE LA PICONNERIE, Thomas Robert, Duke d'Isly, a marshal of France, born at Limoges in 1784, belonged to an Irish family which had settled in France with James II. on his expulsion from the British throne. He entered the army in 1804 as a simple grenadier, was corporal at Austerlitz, where he gave proofs of courage, and the year after was sub-lieutenant. He made the campaigns of Prussia and Poland with his new regiment, and was wounded at Pultusk in 1806. He afterwards went into Spain as lieutenant adjutant-major, gained new promotion, and remained with the army of Aragon till 1814. During these long wars he repeatedly distinguished himself, and received honourable mention from Suchet, his commander-in-chief. On the restoration of the Bourbons he gave in his adhesion to them; but on the landing of Bonaparte, followed the general example by deserting to his old master. After the revolution of 1830 he was appointed *maréchal de camp*, and in 1831 obtained a seat in the Chamber of Deputies, where he often displayed great good sense, though in a style of oratory so blunt and rustic as occasionally to excite the risibility of his opponents. He was afterwards sent to Algeria, where he gained many advantages over the Arabs, and showed himself possessed of the kind of talents necessary to cope successfully with them and their celebrated leader, Abd-el-Kader. On the revolution of 1848, it is said that, if permitted, he would have effectually put down the insurgents and secured the throne to Louis Philippe. He afterwards gave in his adhesion to the republic, but remained unemployed. He was better received by President Louis Napoleon, who appointed him commander-in-chief of the army of the Alps. He died of cholera in 1849.

BUGENHAGEN, John, also Pomeranus, Doctor Pommer, was of great service to Luther in the Reformation. He was born in 1485 at Stettin, and in 1505 was made rector of the school in Treptow. He fled from his Catholic superiors to Wittenberg in 1521, where he was made, in 1522, professor of theology. Luther derived assistance from his profound exegetical learning, in preparing his translation of the Bible. In 1525 he gave occasion for the controversies about the sacrament, by a work against Zwinglius on the communion. He acquired more reputation by his excellent Interpretatio in Librum Psalmorum (Nürnberg, 1523). He effected the union of the Protestant free cities with the Saxons, and introduced into Brunswick, Hamburg, Lübeck, Pomerania, Denmark, and many other places, the Lutheran service and church discipline. For the Lower Saxons he translated the Bible into Low German (Lübeck, 1533). He was a faithful friend to Luther, and delivered his eulogy. Together with Melanchthon, he composed the Interim of Leipzig. He wrote also a History of Pomerania. He died in 1558.

BUGIS, a people, Indian Archipelago, chiefly inhabiting Macassar and Boni, in the island of Celebes. They are muscular, middle-sized, and of a light-brown colour, some being even fair. Their dress consists of a piece of red or blue striped cotton, which they wrap about their loins, and pass between their legs. They bind their jet-black hair very tastefully, in a red or blue cotton handkerchief. They pluck out the hair of their beards, and ornament their arms and legs with brass wire above the wrists and ankles, and to these the children attach bells. They are, to

the last degree, sanguinary, revengeful, crafty, and treacherous, and it is rarely that they see an enemy without circumventing him, and depriving him of his life. On the other hand, under good treatment, they have often been found, even as slaves, faithful and obedient. Their weapons are the creese (a kind of dagger), and a club of the hardest wood, 8 feet long. The original country of the Bugis of Wayu, who are the most enterprising navigators of the Indian islands, is the banks of the great fresh-water lake Tapara-Karaja, in the N. part of the S.W. peninsula of Celebes, and communicating by rivers navigable for the largest native craft, both with the Bay of Boni on the E., and with the sea on the W. The voyage from the shores of the lake begins with the east monsoon, the prahus trading as they proceed W., until they reach Rhio, or even Malacca and Acheen, when they are prepared to return with the change of the season. They take with them native cotton cloths, gold-dust, nutmegs, Spanish dollars, birds'-nests, camphor, benzoin or frankincense, and tortoise-shell; and return with European broadcloths and cottons, opium, unwrought iron, and tobacco, which they partly sell at the intermediate ports as they sail homewards. This is their most important voyage, but they make many subordinate ones for collecting birds'-nests, feathers, tortoise-shell, trepang, and other articles of commerce.

BUGLE-HORN. See HORN.

BUGLOSS, a popular name applied to a number of plants of the natural order Boragineæ, and in particular to the alkanet (which see).

BUHL-WORK, a description of inlaid work, said to have been invented by Boule, a French cabinet-maker, in the reign of Louis XIV. It consisted at first of inserting a brass scroll or pattern in a ground of dark-coloured tortoise-shell or wood; but at a later period the use of wood of a different colour, instead of metal, was introduced by Reisner, and to his process the modern practice of buhl-work is chiefly confined. It consists in cutting out a pattern from two veneers of different coloured woods, which are glued together with a piece of paper laid between them; the pieces are then separated by running a thin knife through the paper, the patterns are carefully taken out, and the figure removed from the one veneer is inserted into the cavity of the other, the dust of the wood being rubbed in to fill the interstices. A little glue is then rubbed in, and the work laid aside to dry, after which it is ready to be glued to the box or piece of furniture which it is wished to ornament. The cutting of the pattern is effected by the use of a very fine saw, of the kind known as a key-saw, which can readily be made to run around the sinuosities of the pattern. The suitable designs for this work are continuous figures, like a running vine or the honeysuckle, the saw completing these without the necessity of discontinuing the work to commence anew. Two pieces of buhl-work are thus produced; but three are frequently obtained by gluing together three pieces of wood and cutting out in the same manner. It is not, however, found expedient to combine a greater number of pieces. The French term for buhl-work and all sorts of inlaid work is *marqueterie*, which is distinguished into *marqueterie en bois*, and *marqueterie en métal*.

BUILDING SOCIETIES are societies formed for the purpose of providing the poorer classes with suitable dwellings, either as tenants or proprietors, at a comparatively cheap rate, or for the purpose of raising a fund by subscriptions to enable the members to become owners of small portions of heritable property, freehold or leasehold. The latter class of societies are called benefit building societies, to distinguish them from the others, which generally take the form of proprietary companies. The benefit building societies are the oldest, and in England at least by far the most common. The first society of this kind, however, was not founded in England, but in Scotland, where one was established under the patronage of the Earl of Selkirk at Kirkcudbright in 1815. In a few years the principle was introduced into England, and similar societies started up in all directions; and in that country they have increased so rapidly that they are now numbered by thousands. These societies are of two chief kinds, either limited to a certain term of years, and confined to a certain number of members, or permanent, and not confined to any definite number of members, but ready to receive new members as long as the society exists. In the first case the members all begin to pay their subscriptions at the same time, and these they repeat at stated intervals until the amount of the share which has been previously fixed has been entirely paid up by means of the subscriptions along with the interest upon them. As soon as this is done the society is practically at an end, and all that is left to do is for the society to arrange its affairs and pay to each of the members the shares to which he is entitled. When any member has received an advance from the society for the purpose of building a house for himself, for the purchase of land, or any other object, the amount of the advance as well as the amount of any burdens that may still be resting on his property is of course taken into account when the affairs of the society are wound up, and is deducted from the amount of the share or shares due to him; but when no advance has been made the member receives the full amount of his share. The duration of such a society may always be calculated beforehand from the amount of each subscription, the rate of interest paid for advances, and the value fixed for each share. As a rule they last from ten to fourteen years. One objection to this kind of society is, that while during the first years of its existence it is impossible to satisfy the numerous demands for loans made by the members, on account of the small amount of the subscriptions already paid in, during the last years of its existence, on the other hand, there is difficulty in finding members willing to receive advances from the society, since they prefer to wait for a time and receive an increased amount when the society is wound up. When the demands of borrowers are greater than can be met by the funds at the disposal of the society, those who are to receive the first advances are determined by lot, and those who are unsuccessful must either buy the right from those who have been more fortunate, or wait till perhaps they no longer need the advances. On account of these disadvantages the limited society is rapidly giving way to the permanent kind, which are now by far the most numerous. These, by the constant admission of new members, have a constant supply of funds at their disposal, and are thus able to supply the demands of all the borrowers, while the security offered to investors induces many people to enter the society merely with the view of having a convenient means of depositing their savings, and not with the intention of acquiring any real property for themselves. When the subscriptions of the members are not enough to meet the claims of borrowers, the society may itself borrow from other sources. When a society is fully organized, any member wishing to possess a small portion of real property has only to inform the society, which gets an estimate made of its value, and when satisfied with regard to that supplies the applicant with the purchase-money, or effects the purchase in name of the applicant. He may enter at once into possession of the property, but of course the full rights of ownership do not

belong to him until he has paid back the advance he has received from the society. This is done by instalments, which are usually paid once a month, and are, in the best societies, made smaller or greater according to the ability of the borrower. The time within which the sum borrowed is paid back must of course depend upon the amount of each instalment compared with the whole amount of the debt, but the usual period is thirteen years. In any case the amount paid annually in the way of instalments is only a little more than what the ordinary rent of an equally good house would be, while the occupant has the satisfaction of knowing that at the end of a certain time the payments will cease entirely, and he will be owner of his own dwelling. The fact which makes it possible for societies of this nature to be carried on successfully is that the ordinary rent of houses is higher than the interest which would be paid at the ordinary rates on the money which would buy the same houses. Were this not the case no advantage would be gained from the method of borrowing money to buy a house, because the borrower would have to pay a sum equal to the rent as interest, and all that helped to pay off the debt would have to be paid in addition. As it is, only part of an ordinary rent is absorbed by interest, while the other part, which increases at every payment, helps to clear off the debt entirely. Benefit building societies have been put under the protection of the legislature by 6 and 7 William IV. cap. xxxii., and the provisions of the Friendly Societies' Acts apply also to them.

The other kind of building societies, those which take the form of proprietary companies, although comparatively rare in this country, are by far the most common on the Continent. The first of the kind in this country was founded in London in 1842, and there are now above thirty of them in existence in Great Britain and Ireland. By the Labourers' Dwellings Act of 1855 facilities were given for the formation of proprietary companies intended to afford cheap and suitable dwellings to the poorer classes, and regulations were passed as to the manner in which the houses were to be built. In France there have been similar societies since 1849, the largest and best known of which is that which was founded at Mülhausen in Alsace in 1853. In the same year a society was formed with similar objects in Switzerland. The oldest institution of the kind in Germany is that which was founded at Berlin in 1848, but the one at Frankfort (founded in 1860) also deserves to be mentioned on account of the great success with which it has been conducted. Some of the building societies of this kind merely aim at supplying good houses at a cheaper rent than usual, the houses always remaining the property of the company, and being occupied by tenants in the ordinary way. Others, like the benefit building societies, make it their object to enable the tenants to become in course of time the owners of the land and dwellings that they occupy. With this view a little more than the ordinary rent is charged, and while the ordinary rents are applied to the payment of a moderate interest on the capital invested in the company by the shareholders, the excess with the interest which accumulates upon it goes to defray the cost of the property, and when the full amount is paid up the tenant becomes owner. When all the tenants of the houses originally built by a company have in this way become proprietors of the houses and land they occupy, the shareholders will have received back all the capital originally advanced by them, and thus either the company may be dissolved, or the money applied to the erection of new houses.

BUILTH, a small town of Wales, in Brecknockshire, delightfully situated on the Wye. It was probably the Roman station *Bullæum*, and Roman relics are yet occasionally discovered there. The Britons built a castle there when driven from their country by the Saxons, which was occupied by the English after the Conquest. Llewellyn, the last Welsh prince, was slain in the neighbourhood in an engagement between the Welsh and English. Builth has mineral springs, which are much frequented. Pop. 1059.

BUINAAH POINT, a cape on the W. coast of Ireland, in the county of Mayo, on the S. side of the entrance into Newport Bay. Lon. 9° 45′ W.; lat. 53° 46′ N.

BUJALANCE, a city, Spain, Andalusia, 21 miles E. by N. Cordova, on an elevated plain in a mountainous district. Manufactures—cloth and woollen fabrics, earthenware, and glass. Trade—exporting wheat, oil, and industrial produce, and importing wool. A large cattle-fair is held in August and September. Pop. 9000.

BUKOWINA. See GALICIA.

BULAC, or BOULAC, in Egypt, the port of Grand Cairo, on the Nile, about 1 mile distant from that city. It is irregularly built, and contains a custom-house, a fine palace, a school of languages, a celebrated printing-office, set up by Mehemet Ali in 1822, and a large bazaar. In 1799 it was almost destroyed by the French. Niebuhr seems to fix on this as the site of the ancient Litopolis. The baths are fine. Pop. 5000.

BULACAN, a town, Philippines, island of Luzon, capital of province of same name, about 22 miles N.W. of Manilla, and connected with the latter by an excellent road. The streets are spacious, and the houses of wood, with the exception of the church, the residence of the chief magistrate, and the government-house, all of which are of stone. Among the inhabitants are many wealthy sugar-manufacturers; a great number are also employed in manufacturing various kinds of fabrics, particularly mats or carpets of silk. The environs of Bulacan are extremely picturesque. Pop. about 10,000.

BULAMA, an island on the W. coast of Africa, one of the Bissagos. It is 18 miles long and 9 broad, and is situated about 2 miles from the mouth of the Rio Grande. It is very fertile, but not easy of access. The Bulama Association attempted to colonize it in 1792, but it was soon abandoned. Lon. 15° 37′ 8″ W.; lat. 11° 31′ 18″ N.

BULARCHUS, the earliest painter on record, is supposed to have flourished at least B.C. 720. He lived in Lydia, in Asia Minor, and is said by Pliny to have painted a picture for King Candaules, the subject of which was the defeat of the Magnesians, and for which he was paid, according to one account, its weight in gold, and according to another, as much gold coin as would cover it. It has been shown, however, that either Pliny must have been mistaken with regard to the facts, or (what is still more probable) that the whole circumstance is fictitious.

BULB, the name of a kind of bud belonging to certain perennial herbaceous plants, and particularly to the monocotyledons. It is always underground, and is supported by a kind of solid and horizontal plate, lying between it and the true root. To this flattened 'tubercle' the fleshy scales of which the bulb is externally formed are fixed by their base. The interior contains the rudiments of the flower-stalks and leaves. The outermost of these scales are thin and dry like paper, but they become more fleshy and succulent in the interior. Sometimes these scales are of one piece, a single scale embracing the whole circumference of the bulb, as in the onion and the hyacinth. They are then named 'coated' or 'tunicated bulbs.' At other times the

scales are smaller and free at the sides, and cover one another only in the manner of tiles on a roof, as in the white lily. Lastly, the coats are sometimes so close as to be confounded together, so that the bulb seems as if formed of a solid and homogeneous substance. Such bulbs are called 'solid,' and they are exemplified in the common saffron. Bulbs again are either 'simple,' as in the tulip and squill, or they are 'multiple,' or formed of several small bulbs collected under the same envelope, as in garlic. Bulbs are reproduced every year, but the manner of reproduction is different in different species. Sometimes the new bulbs arise in the very centre of the old ones, as in the common onion; sometimes from the side, as in meadow-saffron; sometimes entirely new bulbs are developed at the side of the old ones, as in the tulip and hyacinth, or above them, as in the gladiolus, or beneath them, as in many species of Ixia. In common language the young bulbs are named 'offsets.'

BULGARIA, EUROPEAN or LITTLE, a portion of Turkey which owes its name to the Asiatic race of Bulgarians (which see) who overran it. The province of the Danube embraces the greater part of Bulgaria, and the general governor resides at Rustchuk. It is nearly in the form of a triangle, inclosed by the Danube on the N., the Black Sea on the E., the Balkan (which see) or Mount Hæmus on the S. and W. The province is 40,000 square miles in extent, with a pop. of 2,047,000 inhabitants, engaged in agricultural labours, peaceful and industrious, and mostly members of the Greek Church. The whole province, except in the neighbourhood of the Danube and the Black Sea, is rugged and mountainous. From the eastern extremity of the Balkan a branch runs north-easterly, nearly parallel with the Euxine, and the streams flow northerly and westerly to the Danube, or south-easterly to the sea. The soil is very productive; all sorts of grain, cattle, wool, iron, and wine are raised in abundance, and the province is considered by the Turks the granary of Constantinople. About Philippopoli are large rice farms. A very fine wool is brought from the pastures near Nicopoli, and silk, honey, wax, and tobacco are important articles of produce. Dobrudsha, the sandy plain on the Black Sea, is famous for its horses, which are small, but strong and well shaped. Some of the principal towns, besides those already mentioned, are Silistria, taken by the Russians June 28, 1829, 216 miles N. of Constantinople, Brailow, Varna, Chumla, or Schumla, which have been the objects of violent contest between the Russians and Turks.

BULGARIANS, or VOULGARIANS, an ancient Turkish or Tartar nation, which in the fourth century was settled on the Volga. The ruins of their former capital may still be seen in the neighbourhood of Kazan. Their kingdom, which occupied a part of the Asiatic Sarmatia of the Greeks, is called *Great Bulgaria*, and is now comprehended in the Russian government of Orenburg. They afterwards removed to the countries between the Bog and the Danube, and called their territories *Second Bulgaria*. They passed the Danube in 539, made themselves masters of the coasts of the Black Sea as far as Mount Hæmus, subdued the Slavonic tribes of that region, and founded the kingdom of Black Bulgaria. They penetrated Thrace, Macedonia, and Thessaly, and their wars with the Greek Empire were very sanguinary. Whole provinces were reduced to deserts, called *Bulgarian forests*, and the Greeks, not less barbarous, put out the eyes of 15,000 Bulgarian prisoners in one day. Their kingdom, which extended, in 1010, over Macedonia, Albania, and Servia, was destroyed by the Emperor Basil II., and the dispersed tribes took refuge in Turkey, in 1185. Those who remained in Bulgaria revolted, and formed with the Walachians a new kingdom, which was sometimes the ally and sometimes the vassal of the Byzantine Empire, until it was finally conquered by the Ottomans in the end of the fourteenth century.

BULIMIA. The persons attacked by this disorder are tormented with an insatiable hunger. When their stomach is surfeited they are seen to faint, and throw off the food which they have taken half-digested, and with violent pain. It usually appears as a concomitant of other diseases. It occurs during certain intermittent fevers, in certain diseases of the stomach and bowels, particularly in such as are produced by the tape-worm; and is also common after fevers by which the strength of the patient is exhausted. In this last case it arises from the effort of all parts of the body to supply the lost flesh and strength. In certain cases, however, the extraordinary desire for food seems to be caused by a particular condition of the stomach, which digests with too great rapidity. This is observed sometimes in women during their pregnancy, in young people who take too violent exercise, and in persons who take much high-seasoned and heating food. In this case the desire is not to be considered as a disease, but only as an excessive appetite. As a disease its consequences are dreadful —leanness, pulmonary fevers, consumption, constipation, dropsy.

BULK-HEADS, certain partitions or walls built up in several places of a ship between two decks, either lengthwise or across, to form and separate the various apartments.

BULL, the name applied to the males of all the species of OX. See OX.

BULL, an instrument, ordinance, or decree of the pope, treating of matters of faith or the affairs of the church, written on parchment on the rough side, and provided with a lead seal, upon the obverse of which the figures of St. Paul and St. Peter were impressed till the sixteenth century, after that the coat of arms of the reigning pope, and on the reverse side of which appears the name of the pope. In the case of those bulls which are issued between the election and consecration of a pope, the side on which the coat of arms is impressed is left empty. Such bulls were called *bullæ dimidiæ*, that is, half-bulls. The word was originally the name of the seal itself. The papal bulls are commonly designated by the words with which they begin; for example, the bulls In cœna Domini, Cum inter, Unigenitus, Ascendente, &c. Certain ordinances of the German emperors are also called *bulls*. (See GOLDEN BULL.) A collection of bulls is called a *bullary*. Many of these bullaries have been published since the sixteenth century. The official collection of bulls is called 'Bullarium privilegiorum ac diplomatum Romanorum Pontificum usque ad Clementem XII.' (thirteen vols. Rome, 1738–45), which has been continued under various titles to the end of the reign of Gregory XVI. (1848).

BULL, JOHN. See JOHN BULL.

BULL-BAITING, the barbarous sport of setting dogs on a bull, who is tied to a stake and torn to death for the amusement of the spectators. In this case the dogs, which were set upon the bull singly, were trained to seize the bull by the muzzle, technically, to 'pin' the bull; but they were very frequently tossed to a considerable distance while attempting to lay hold of the animal. Sometimes also the bull was allowed to run loose in the arena, and then several dogs were set upon him at once. Bears and badgers were baited till very recently in the cockpits in London, and dog-fights also are exhibited in the same places. Bull-baiting was a favourite sport in England from a very early period till about the time of George IV. James I. of England took special delight in it.

BULL-DOG, a variety of the common dog, called by naturalists *Canis molossus*, remarkable for its short, broad muzzle, and the projection of its lower jaw, which causes the lower front teeth to protrude beyond the upper. The *condyles* of the jaw are placed above the line of the upper grinding teeth. The head is massive and broad, and the frontal *sinuses* large. The lips are thick and pendulous; the ears pendant at the extremity; the neck robust and short; the body long and stout; and the legs short and thick. The bull-dog is a slow-motioned ferocious animal, better suited for savage combat than for any purpose requiring activity and intelligence. For this reason he is generally employed to guard houses, especially by the butchers, tanners, &c., and this office he performs with great fidelity. The butchers use bull-dogs in catching and throwing down cattle; and it is surprising to see the apparent ease with which the dog will seize an ox by the nose and hold him perfectly still or throw him on his side at his master's command. In fighting with other dogs, or in attacking animals capable of exciting their fury, bull-dogs display the most ferocious and indomitable spirit. It is stated in the Sporting Calendar that they have suffered their limbs to be cut off, while thus engaged, without relinquishing their hold on the enemy. They become very vicious, and sometimes extremely dangerous, as they advance in years, inflicting dreadful bites for the slightest provocation. Indeed at no period of their lives will bull-dogs allow even their masters to take liberties with them.

BULLEN, ANNE. See BOLEYN.

BULLERS OF BUCHAN, or BOILERS OF BUCHAN, a large oval cavity in the rocks on the coast of Aberdeenshire, 150 feet deep. Boats enter under a natural arch, near which is a large rock, separated by a deep chasm from the land. Through an aperture in the middle of this rock the waves rush with a tremendous noise.

BULLET, the small leaden projectile used for small-arms. Formerly bullets were always of a spherical form, and were cast in moulds; but this oldest kind of bullet has for a good number of years been almost entirely given up, at least for military purposes. In the first place, it was found that the method of casting bullets in moulds was both slow and unsatisfactory in its results. The bullets were rough on the surface, and the spherical form was not given to them with sufficient accuracy. To remedy these defects a machine was invented by Mr. George Napier, by which bullets were made with much more rapidity than by the former method, and at the same time, by means of a spherical die, the proper form was given to them with much more accuracy. But these were not the only defects of the old bullet. The spherical bullet, even when made with perfect accuracy, was far from securing precision in firing, and this kind, especially since the introduction of rifled muskets, has gone more and more out of use. Two great improvements have been made in recent years in the manufacture of bullets. The first consists in the adoption of some means of dilating the bullet at the moment of explosion, so that it is forced into the grooves of the rifle and exactly fills the barrel. The means adopted for this purpose are various. In some cases there is merely a cavity left at the base of the bullet into which the gases formed on the explosion of the gunpowder are forced before the resistance of the bullet to the force of the gunpowder is overcome, so that the gases have the effect of dilating the bullet in the manner required. In other cases a plug is inserted in the cavity, which is driven forward by the explosion of the gunpowder, and has the same effect. The other great improvement consists in the change of the form of the bullet. Of the various forms that by different inventors have been substituted for the spherical, that which was first selected by Minié, an officer in the French army, namely, the cylindro-conical, has now been generally adopted as the best. In such bullets the lower part, that next the gunpowder, is cylindrical, and the upper part is conical, or more properly ogival—that is, shaped like a Gothic vault. This is the form in which the bullet of the Snider-converted Enfield, which is used by the British troops, is made, but it has some peculiarities which distinguish it from the original Minié rifle bullet. It has the cavity at the base like the Minié bullet, in which is inserted a plug of clay; but the rest of the bullet, instead of consisting of solid lead, has a cylindrical chamber proceeding from the apex of the bullet about halfway down the axis, and in this chamber there is inserted a wooden plug. This is a plan which was first adopted in the Metford bullet, and its effect is to make the bullet lighter and also to throw the centre of gravity further back, which secures greater precision in shooting. The bullet of the Snider rifle has also four cannelures or grooves running horizontally round the lower part of it, and these are filled with bees'-wax to lubricate the barrel while the bullet is passing through it. The length of the bullet is 1·0625 inch, the diameter ·55 inch, and the weight 530 grains.

BULLETIN (French; diminutive of *bulla*), an official report giving an account of the actual condition of some important affair; thus the bulletin of the army, of his majesty's health, &c.—The name bulletin is also often given on the Continent to an account of the proceedings of academies and learned societies; thus we hear of the bulletins of the Academy of St. Petersburg, &c.

BULL-FIGHTS are among the favourite diversions of the Spaniards, who, like all the nations of the S. of Europe, are passionately fond of public combats and exhibitions of strength and agility. The excommunications of the popes have not been sufficient to induce them to abandon this amusement. Charles IV. abolished it; but it was revived again by Joseph. The assailants are seldom killed in these sports. The splendid bull-fights formerly exhibited by the king on festival days were very costly. The Spaniards distinguish the *toreo*, in which the bull is killed, from the *corrida de novillos*, where he has his horns tipped with leaden balls and is only irritated. Bull-fights in the capital, and in all the larger cities of Spain, are got up by private persons or for the benefit of some public institution. They are exhibited at Madrid through the summer at least once a week for the benefit of the general hospital. The income from such a spectacle is commonly about 2000 dollars, and the outlay, which goes principally to the combatants, who have their fixed wages, about 1000. The bull-fights are held at Madrid in the *Coliseo de los Toreros*, an amphitheatre having circular seats, rising one above another, and a row of boxes over them. All the spectators are dressed in their best. The combatants, who make bull-fighting their profession, march into the arena in procession, with some magistrate at their head. They are of various kinds —the *picadores*, combatants on horseback, in the old Spanish knightly garb; the *banderilleros*, combatants on foot, in short variegated frocks, with banners; and lastly, the *matador* (the killer). As soon as the corregidor gives the signal, the bull is loosed from the stall. The *picadores*, who have stationed themselves near him, commence the attack. Sometimes a horse is wounded, and the rider is obliged to run for his life. A peculiar kind of foot combatants, *chulos*, assist the horsemen by drawing the attention

of the bull with their banner; and in case of danger they save themselves by leaping over the wooden fence which surrounds the arena. The *banderilleros* then come into play. They try to fasten on the bull their *banderillas*—hollow tubes filled with powder, having strips of paper wound round them and small hooks at the ends. If they succeed the squibs which are attached to them are discharged, and the bull races madly about the arena. The *matador* now comes in gravely, with a naked sword, and aims a fatal blow at the animal. If it is effectual the slaughtered bull is dragged away, and another is let out from the stall. If a bull is too inactive the dogs are set upon him; if he is too violent several horses are often killed. The bull is more furious in proportion as the heat of the weather is greater. Burlesque scenes accompany the spectacle: apes are trained to spring upon the neck of the bull, without his being able to reach them. Men of straw are set up before him, upon which he exhausts his strength. Some of the foot combatants likewise dress themselves grotesquely, to irritate the bull and amuse the spectators. See Doblado's Letters from Spain and Ford's Hand-book of Spain.

BULLFINCH (*Pyrrhula vulgaris*), a well-known European bird, which has a short, rounded, robust bill, a black cap, and plumage on the back of an ash or dark blue-gray colour: the inferior parts of the body are reddish. The female is of a grayish-red beneath. The bullfinch builds its nest in hedges and various trees, and feeds chiefly on different seeds and buds of fruit-trees, for which its strong thick bill is well adapted. The bullfinch is remarkable for the facility with which it is tamed and taught to sing, or even to articulate words. Bullfinches thus taught are sold at high prices, as much as £4 or £5 being demanded for a single bird. Its natural tones are soft, and when taught to repeat tunes by a bird organ, nothing can be imagined more delightfully sweet and clear than its piping. In captivity it appears to be rather a dull and quiet bird, though it displays much attachment to its feeder, showing evident marks of pleasure at his approach, and singing at his bidding. There are other finches which might, no doubt, be taught to perform as well.

BULLFROG. See FROG.

BULLHEAD, the common name of a fresh-water fish belonging to the genus Cottus (*Cottus gobio*, Linn.), which is abundant in nearly all the rivers and streams of Southern and Central Europe, as well as of Great Britain. It is characterized by a large and depressed head, two dorsal fins, with rays produced into short spines, and no swimming bladder. The bullhead, along with the other fresh-water species of the genus Cottus, is distinguished from the marine species by having the head almost quite smooth, there being only one spine on each side of the head on the preoperculum, while among the marine species the whole head is armed with spines or tubercles. The length of the bullhead is only 4 or 5 inches, and its colour is very dark. Its favourite resorts are clear streams, especially such as have stony bottoms, where it lurks among the stones. It is very voracious, and although it lives chiefly on insects, it will also devour any small fish that it can master. Its flesh is said to be very delicate, although many people have a repugnance towards it, owing to the disagreeable appearance of the fish. The spawning season is in March and April, and it is worthy of remark with regard to this fish, that while the female, after having deposited the spawn underneath some stone, pays no more attention to it, and will even devour its young, the male keeps guard over the spot, and will often engage in violent battle on behalf of its young, which it never leaves except for the purpose of obtaining food.

BULLIARD, PIERRE, a French botanist, born at Aubepierre en Barrois about 1742, was educated at the College of Langres, where he showed a decided taste for natural history, proceeded to Paris to pursue his medical studies, and employed his leisure in collecting the materials of a Flora Parisiensis, which he afterwards published in six vols. 8vo, with coloured plates. Among his other works are a Herbier de la France, and a Dictionnaire Élémentaire de Botanique, which has been repeatedly printed. He died at Paris in 1793.

BULLINGER, HENRI, a celebrated Swiss reformer, born at Bremgarten in 1504, studied first at Emmerich, in the duchy of Cleves, and afterwards at Cologne. His intention was to become a Carthusian monk, but after perusing the writings of Melanchthon and other reformers he changed his views, formed a close connection with Zuinglius, became one of the most strenuous supporters of his views, and ultimately succeeded him in his charge of Zürich. He was one of the authors of the first Helvetic Confession, drew up in concert with Calvin the formulary of 1549, by which the differences between the churches of Zürich and Geneva on the subject of the Lord's Supper were happily terminated, and kept up a close correspondence with the principal English reformers. The Zürich Letters, lately published by the Parker Society, contains part of this correspondence, and among others, letters addressed to him by Lady Jane Grey. His numerous theological works form ten vols. folio. He died at Zürich in 1575.

BULLION is uncoined gold or silver, in bars, plate, or other masses. The word *bullion* was of frequent use in the proceedings respecting the Bank of England (see BANK), from 1797, when the order of council was issued that the bank should discontinue the redemption of its notes by the payment of specie to 1823, when specie payments were resumed; for, by a previous law, the bank was authorized to pay its notes in uncoined silver or gold, according to its weight and fineness. The investigations of the bullion committees, and the various speculations on the subject of bullion, related to the supply of gold and silver, whether coined or not, as the basis of the circulating medium. (See CURRENCY.) The discovery of the mines in America did not at first add materially to the stock of bullion in Europe. The total addition for the first fifty-four years was about £17,000,000; not quite so great an amount of value (in gold at least) as Russia has obtained from the Ural mines in less than half the time. The average annual supply from all the American sources during the fifty-four years from 1546 to the end of the sixteenth century, was rather more than £2,000,000. During the seventeenth century the annual average was about £3,250,000; in the next half century it was £5,500,000; and in the years 1750 to 1803 it was £7,600,000. The annual average of gold bullion has been largely increased by the discovery of the Californian and Australian goldfields, and as much as £500,000,000 is understood to have been added to the stock of the world between 1851 and 1871.

BULL TROUT (*Salmo grisens*), a British fish closely allied to the salmon. It lives chiefly in the sea, but ascends rivers for the purpose of depositing its spawn. Its flesh is paler than that of the salmon, and is less esteemed. The weight of the bull trout is commonly under 15 lbs., but sometimes so much as 20 lbs. Its form is not so elegant as that of the salmon, being thicker at the head and nape of the neck, as well as at the tail. Its scales are smaller than those of a salmon of the same size.

BÜLOW, FRIEDRICH WILHELM, COUNT VON DENNEWITZ, royal Prussian general of infantry, knight of several military orders, &c., was born in 1755,

on his father's estate, Falkenberg, in Altmark. In his fourteenth year he entered the Prussian army, and in 1793 was appointed governor of Prince Louis Ferdinand of Prussia. In this capacity he served with distinction in the campaign on the Rhine. In 1795 his charge of the prince ended, and he received a battalion. In the war of 1806 he was a lieutenant-colonel at the siege of Thorn, and distinguished himself in various battles. In 1808 he was made major-general and general of brigade. When the war against France broke out in 1813, he fought the first successful battle, at Möckern, April 5; May 2, took Halle, and protected Berlin from the danger which threatened it, by his victory at Luckau, June 4. After the armistice he commanded the third division of the army under the Crown-prince of Sweden, and saved Berlin a second time by the memorable victory of Grosbeeren, Aug. 23. He relieved the same city a third time by the great victory at Dennewitz. For this service the king made him one of the few grand knights of the Iron Cross, and after the end of the campaign bestowed on him the title *Count Bülow of Dennewitz*, and made the same hereditary in his family. At the storming of Leipzig, Oct. 19, he took an important part. He distinguished himself equally in Westphalia, Holland, Belgium, on the Rhine, at Laon, and took Soissons and Lafere. After the peace he was commander-in-chief in East Prussia and Lithuania. At the opening of the campaign of 1815 he received the chief command of the fourth division of the army, with which he contributed so essentially to the victory of Waterloo, that the king gave him the command of the fifteenth regiment of the line, which was to bear in future the name of the *Regiment of Bülow von Dennewitz*. Jan. 11, 1816, he resumed the chief command in Königsberg, in Prussia, and died there, Feb. 25, 1816.

BÜLOW, HENRY VON, born at Falkenberg, in Altmark, about 1757, studied in the military academy at Berlin, and afterwards entered the Prussian service. But he soon retired, and occupied himself with the study of Polybius, Tacitus, and J. J. Rousseau, and then served for a short period in the Netherlands. He afterwards undertook to establish a theatre, but immediately abandoned his project, and visited the United States, from whence he returned poor in purse but rich in experience, and became an author. His first work was on the Art of War, in which he displayed uncommon talents. He wrote a book on Money, translated the Travels of Mungo Park, and published, in 1801, his History of the Campaign of 1800. In 1804 he wrote Lehrsätze des neuern Krieges (Theory of Modern Warfare), and several other military works, among which is Tactics of the Moderns as they should be. In the former he points out the distinction between strategy and tactics, and makes the triangle the basis of all military operations. This principle of his was opposed by Jomini, and other French writers. His history of the war of 1805 occasioned his imprisonment in Prussia, at the request of the Russian and Austrian courts. He died in 1807 of a nervous fever, in the prison of Riga. He was a follower of Swedenborg.

BULRUSH, a popular name for tall, reed-like plants which grow in marshy places, and which for the most part belong to the genus Scirpus. The common bulrush is frequent in clear waters and about the borders of rivers throughout Europe, as well as in North America and New South Wales. The roots are thick and stout, creeping under water in the deep mud; the stems are of a dark-green colour, and 4 or 5 feet or more in height, and are naked, smooth, round, tough, pliant, and spongy within. Their base is covered with several sheathing scales, partly ending in leafy points. They are useful for packing and thatching, and especially for plaiting into the bottom of chairs.

BULWARK. See BASTION.

BULWER, JOHN, a physician who flourished in England in the seventeenth century, appears to be entitled to the honour of having first pointed out a method of instructing the deaf and dumb. The work in which his method is explained is entitled, Philocophus, or the Deafe and Dumbe Man's Friend, exhibiting the Philosophical Verity of that subtile Art which may enable one with an observant Eie to heare what any Man speakes by the moving of his Lips. This work was published in 1648, whereas Willis, to whom the invention has generally been attributed, published nothing on the subject till 1670. In connection with the same subject Bulwer published a Chironomia, or the Art of Manual Rhetoric; and a Chirologia, or the Natural Language of the Hand. A still more curious work is entitled Anthropometamorphosis, in which he shows the astonishing variety of forms and garbs exhibited by man in the different ages, and among the different nations.

BULWER LYTTON. See LYTTON (LORD).

BUM-BOAT, a small boat used to sell vegetables, &c., to ships lying at a distance from shore.

BUNDELCUND, a district of Hindustan, lying between 24° and 26° N. lat. The country is mountainous and stony, and produces all kinds of fruit. It was ceded by the Mahrattas to the British in 1804. It is hilly, contains the almost exhausted diamond mines of Panna, and has soil of every variety, which yields almost every grain and plant of India. Bundelcund includes some sections of the North-western Provinces, and several native states under British protection. Area of the former, 19,700 square miles; of the latter, 8394 square miles; pop. of former, 1,700,000; of latter, 825,000. Bandah, Callinjer, and Jhansi are the chief towns.

BUNGALOW, an East Indian term for a kind of country-house with a thatched or tiled roof. Bungalows are generally of one story, though sometimes of two, and have always a verandah running round them to afford a shelter from the sun. They form the dwellings in which the Europeans uniformly reside. Public bungalows for travellers are maintained by government on the main highways.

BUNGAY, a market town, England, county Suffolk, on the right bank of the Waveney, 30 miles N.E. of Ipswich. It occupies the sides and summit of a gently rising hill, and is neatly and well built; streets spacious and well paved, diverging from a moderate-sized area in the centre of the town forming a market-place, in which is a handsome market-cross. Its churches are, St. Mary's, an elegant structure, with a beautiful steeple; and the Holy Trinity Church, a small ancient building with a round tower, and an ancient elaborately-carved pulpit. The principal trade is in corn, coals, flour, lime, and malt, in which a considerable amount of business is done. There is also an extensive printing-office and stereotype foundry. Adjoining the town is a very spacious common. Pop. in 1871, 3503.

BUNION, a small, hard, painful tumour which is formed in the neighbourhood of the joints of the toes, especially the metatarsal joints, and which consists in the swelling of the bones themselves, which fact distinguishes bunions from corns. It appears to be caused by the pressure of a boot or shoe which is too tight, especially when the feet are a little deformed. The best means to adopt in order to relieve the pain is to remove the causes of the tumor as soon as possible, to give rest to the foot, and to apply lotions and emollient poultices.

BUNIUM FLEXUOSUM, or BULBOCASTANUM (*Pig-nut*), an umbelliferous plant which grows in

sandy and gravelly pastures, and produces one small, round, knotty tuber, which is edible, sweet, and wholesome, but too small to be of much value. It has some slight medical reputation, and has been recommended in phthisis.

BUNK is a word used in America to signify a case or cabin of boards for a bed. Thus, in the army, the soldier's berth is called the *bunk*. In sea language it signifies a sleeping-place in the fore-peak of merchantmen, as well as a standing bed-place fixed on the side between decks.

BUNKER HILL. See CHARLESTOWN.

BUNSEN, CHRISTIAN KARL JOSIAS, CHEVALIER, a distinguished German statesman and philosopher, was born at Korbach, in the principality of Waldeck, on 25th August, 1791. From early youth he turned his attention to the science of philology, studying it under Heyne at Göttingen, and subsequently proceeding to Holland and Denmark, to acquire a critical knowledge of the Danish and Dutch languages. In the end of 1815 he made the acquaintance at Berlin of the celebrated Niebuhr, and in the spring of 1816 proceeded to Paris, where he studied Persian and Arabic under Sylvestre de Sacy. The same year he visited Rome, where he married, and renewed his intimacy with Niebuhr, then Prussian ambassador at the Papal court. Niebuhr procured for his friend the appointment of secretary to the Prussian legation, and on his quitting Rome in 1823, Bunsen was intrusted with the performance of his duties, and in 1827 formally accredited as resident Prussian minister. In this capacity he continued till 1838, and conducted several important negotiations with the Papal see, the result of one of which was the brief of Leo XII. relative to mixed marriages. His situation ceased to be agreeable after the commencement of the Cologne embroilments, which he vainly endeavoured to adjust, and he accordingly applied for a recall, which was granted, under the form of permission to make a journey to England. On his return from thence he received a mission to proceed to Berne as ambassador to the Swiss Federation. During his residence at Rome Bunsen had industriously pursued his philosophical and historical studies, including more especially that of the Platonic philosophy, and investigations into the religious and ecclesiastical history of mankind. The liturgies of the Church received his especial attention, and a service of his own framing, introduced by him into the chapel of the Prussian embassy at Rome, was printed by order of the King of Prussia, who himself wrote a preface to it. This work was published without the author's name, at Hamburg in 1846, under the title of Allgemeines evang. Gesang-und Gebetbuch (General Hymn and Prayer Book of the Evangelical Lutheran Church), and may be regarded as a new edition of the Versuch eines allgemeinen evang. Gesang-und Gebetbuchs, published at Hamburg in 1833.

In 1841 Bunsen was summoned to Berlin from Switzerland to proceed to England in charge of a mission for the establishment, in conjunction with that country, of a bishopric at Jerusalem. Shortly afterwards he was nominated Prussian ambassador in England. On the occasion of a visit to Berlin in 1844 he was consulted on the subject of granting a constitution to the country, and is said to have drawn up and submitted to government the form of one which bore a very close resemblance to that of Great Britain. In the matter of the Schleswig-Holstein question he strenuously supported, in his capacity of English ambassador, the claims of Prussia and the German Confederation in opposition to those of Denmark. From the opposite views taken by him to those of his government in relation to the Russian war he was recalled from London in 1854, and abandoning politics, retired to Heidelberg to devote himself exclusively to literary pursuits. The results of these have established his reputation as one of the most profound and original critics in the department of biblical and ecclesiastical history. Among these are, Die Verfassung der Kirche der Zukunft (The Constitution of the Church of the Future), Hamburg, 1845; Aegyptens Stelle in der Weltgeschichte (Egypt's Place in the World's History), Hamburg, 1845; Hippolytus und seine Zeit (Hippolytus and his Time), London, 1851; and lastly, his greatest work, Bibelwerk für die Gemeinde (Bible Commentary for the Community), the first part of which was published in 1858, and was intended to be completed in 1862. It had occupied his attention for nearly thirty years, and, as he informs us, was regarded as the grand centre-point to which all his literary and intellectual energies were to be devoted. Death interposed to prevent him completing his undertaking. For some years the state of his health had been such as to cause anxiety to his family; and with the view of restoring it he was recommended to try the effects of a more genial climate. He accordingly spent the winters of 1858–59 and 1859–60 at Cannes, in the s. of France, returning from thence in the spring of 1860 to Bonn, whither he had recently transferred his abode from Heidelberg. His sojourn in the s. had effected no lasting improvement, and by the month of October it was evident that he was sinking fast. He expired on the morning of 28th November, 1860. A continuation of his Bibelwerk has been published since his death, and in this it is announced that, in accordance with the last will of the author, the whole work will in course of time be completed by the aid of his manuscript papers.

BUNT, the middle part or cavity of the principal square-sails, as the main-sail, fore-sail, &c. If one of them be supposed to be divided into four equal parts, from one side to the other, the two middle divisions, which comprehend half of the sail, form the limits of the bunt.

BUNT, sometimes called SMUT BALL, PEPPER BRAND, and BRAND BLADDERS, the most formidable disease, perhaps, to which wheat is subject, but one which may in most instances be greatly modified, and which seldom in the present day does material injury, except where there is careless cultivation. Like many other of the diseases to which the cereal plants are subject, it arises from the attack of a parasitic fungus (*Uredo caries*). It is generated in the ovary of wheat and a few other Graminese, and very rarely on the stem. It is formed at an early stage of growth, before the ear is free from the sheath; and indeed the plants which are affected by the parasite may be readily recognized by their unusual luxuriance, being generally several inches higher than plants not affected, larger in bulk, and often producing a greater number of stems from the same root. The bunted grains are shorter and blunter than the sound, of a dark-green when young, but when old of a pale brown, or sometimes nearly black. The contents of the ovary are reduced to a uniform black powder or paste, which has an offensive smell like that of decayed fish. Various substances have been used by cultivators to prevent the growth of bunt, such as salt, quicklime, arsenic, corrosive sublimate, &c. Careful washing and a selection of good seed will alone prevent much mischief, but it is advisable to take some more stringent measures with a view to destroy the vitality of the bunt spores. For this purpose Dombasle's method is the most successful. It consists in thoroughly wetting the grain with a solution of sulphate of soda (Glauber's salts), then drying the wheat with quicklime, which combines with the water to make sulphate of lime (gypsum), which acts as a manure,

while the caustic soda destroys the vegetative powers of the bunt spores.

BUNTER SANDSTEIN. See GEOLOGY.

BUNTING, a thin woollen stuff, of which the colours and signals of a ship are usually formed.

BUNYAN, JOHN, author of the Pilgrim's Progress, was the son of a tinker, and was born at the village of Elstow, near Bedford, in 1628. He followed his father's employment, and for some time led a wandering, irregular life. During the civil war he served as a soldier in the army of the Parliament; and the danger to which he was then exposed probably brought him to reflection, in consequence of which his conduct became reformed, and his mind impressed with a deep sense of the truth and importance of religion. He joined a society of Anabaptists at Bedford, and at length undertook the office of a public teacher among them. Acting in defiance of the severe laws enacted against dissenters from the Established Church, soon after the Restoration, Bunyan incurred the sentence of transportation, which was not executed, as he was detained in prison more than twelve years, and at last liberated through the charitable interposition of Dr. Barlow, bishop of Lincoln. To this confinement he owes his literary fame, for, in the solitude of his cell his ardent imagination, brooding over the mysteries of Christianity, the miraculous narratives of the sacred Scripture, and the visions of Jewish prophets, gave birth to that admired religious allegory, the Pilgrim's Progress—a work which, like Robinson Crusoe, has remained unrivalled amidst a host of imitators. His Holy War made by Shaddai upon Diabolus, his other religious parables, and his devotional tracts, which are numerous, are also remarkable, and many of them valuable. There is a curious piece of autobiography of Bunyan extant, entitled Grace abounding to the Chief of Sinners. On obtaining his liberty, Bunyan resumed his functions as a minister at Bedford, and became extremely popular. He died during a visit to London in 1688.

BUNZLAU.—1. A town, Prussia, in the province of Silesia, on the Bober and the railway between Frankfort and Breslau, 25 miles W. of Liegnitz, with 8817 inhabitants. It is surrounded by a double line of walls, flanked with bastions, and by a deep ditch, and has in its market-place an iron obelisk to the Russian general Kuttusov, who died here in 1813. Opitz, considered the father of German poetry, was a native of this Bunzlau.——2. ALT and JUNG BUNZLAU, two towns, Bohemia, the former 15 miles N.W., and the other 31 miles N.E. of Prague. Alt-Bunzlau, in the circle of Kaurzim, and near the right bank of the Elbe, has a collegiate school and a church, much resorted to by pilgrims. Pop. 3063. Jung-Bunzlau, the capital of the circle of Bunzlau, stands on the left bank of the Iser, is well built, and has an old fort, built by Duke Boleslas in 973; several churches, a synagogue, a Piarist gymnasium, and 8695 inhabitants, chiefly engaged in manufacturing cottons, woollens, muslin, soap, and leather.

BUONAPARTE. See BONAPARTE.

BUONAROTTI, MICHEL ANGELO. See ANGELO.

BUONAROTTI, MICHEL ANGELO, nephew of the great Michel Angelo, from whom he is distinguished by the name of the younger, was born at Florence in 1568, and having shown an early taste for literature, was admitted a member of the Florentine Academy when only seventeen years of age. He was also a member of the Academy della Crusca, and gave important assistance in the compilation of its large dictionary. His literary fame rests on two comedies, entitled La Tancia and La Fiera. The former is written in the peasant dialect of Tuscany; the latter, remarkable for the purity of its style, is divided into five days, and each day into five acts, forming in fact five successive comedies on the same subject. It was performed publicly at Florence during the carnival in 1618, but was not published till 1726. According to Dr. Johnson it was written to furnish the Academy della Crusca with terms of art and manufacture, which they might insert in their dictionary. He laments that a similar assistance was not afforded to himself, so as to enable him to enrich his dictionary with similar terms, which have been in consequence unavoidably omitted. Buonarotti died in 1646 at Rome, where for some time he taught mathematics to the nephews of Pope Urban VIII.

BUONTALENTI, BERNARDO, surnamed Dalle Girandole, a painter, sculptor, and architect, was born at Florence in 1536, and died in 1608. When he was eleven years of age an inundation of the Arno broke into the quarter of Florence where his family resided, and carried off every member of it except himself. Cosmo de' Medici, on learning the disaster, received him into his palace, and improved the taste which he had displayed for drawing by placing him in the schools of Salviati, Bronzino, and Vasari. He displayed great versatility of mind, and excelled not only in the kindred arts of painting, sculpture, and architecture, but distinguished himself as a mathematician, a military engineer, and an inventor of machines. To his skill in making artificial fireworks he owes his surname of Dalle Girandole. His principal works are the palace of Pratolino in the Apennines and the Florence gallery.

BUOY, any floating body employed to point out the particular situation of anything under water, as of a ship's anchor, a shoal, &c.—The *can* buoy is of a conical form, and painted with some conspicuous colour; it is used for pointing out shoals, sand-banks, &c.—The *cask* buoy is in the form of a cask; the larger are employed for mooring, and are called mooring buoys; the smaller for cables, and are known as cable buoys. The buoy-rope fastens the buoy to the anchor, and should be about as long as the depth of the water where the anchor lies; it should also be strong enough to draw up the anchor in case the cable should break.—The *life* or *safety* buoy is intended to keep a person afloat till he can be taken from the water. It should be suspended from the stern of the ship, and let go as soon as any person falls overboard. A light may be attached to it, both to indicate its position to the individual in danger, and to direct the course of the boat sent to relieve him, if the accident happens by night. An ingenious self-lighting buoy is now used in the British navy.

BUPALUS, a sculptor and architect of Chios, who seems to have flourished about B.C. 500. He executed several fine works for the city of Smyrna, and particularly the Three Graces in gold. His quarrel with Hipponax, a celebrated satirical poet, is well known. In the course of the quarrel the sculptor caricatured the poet by his plastic figures, and the poet lashed the sculptor by his verses. Victory seems to have declared for the satirist, and Bupalus is said to have taken the matter so seriously to heart that he hanged himself.

BUPRESTIDÆ, a family of coleopterous insects, many of which are remarkable for the splendour of their appearance. This family is included in the section of Coleoptera, which was formed by Latreille, and named by him Pentamera, because the members of it have five joints in the tarsi. The characters of the Buprestidæ are: body ovate, elongated, somewhat broad and obtuse in front, but pointed behind; eyes oval, with the antennæ inserted between them; jaws powerful. They walk slowly, but fly with great rapidity, especially in warm weather. They are very fond of sunning themselves on bushes, or the branches

of trees. When one attempts to seize them, sometimes even when one approaches them, they allow themselves to fall suddenly to the earth, or fly rapidly away. There are several hundred species belonging to this family, most of which are found within the tropics, and the tropical species are those which are chiefly distinguished by the brilliancy of their colours. The prevailing colour appears to be green, but species are often found of a blue, red, golden, or other colour. The *Buprestis gigas* of Linnæus, which is about 2 inches in length, and one of the largest of the family, has bright golden elytra, or wing-cases, which are often used as ornaments by the inhabitants of South America, of which continent it is a native.

BURBOT, or BURBOLT (*Lota vulgaris*), a fresh-water fish of the same genus as the ling, and belonging to the Gadidæ or cod family, of which it is the only British fresh-water species. It has an elongated body covered with small scales, and also with a numerous secretion; a small head; two dorsal fins, of which the second is very long and reaches to the base of the tail fin, which is oval and slightly pointed; a long anal fin, and a single barbule on the lower jaw. In length it sometimes attains 2 feet, and it is said to have been found 16 or even 20 lbs. in weight; but they are never found nearly so large, except in large lakes. The ordinary weight is about 2 lbs. The colour is yellowish-brown, rather dark, and marked with spots on the upper parts, but lighter underneath. In England it is found in the Trent, Cam, and other rivers on the eastern side; in Scotland it is not found at all. It is more abundant in the rivers and lakes of the Continent than in the British Isles, and it is particularly plentiful in the Upper Rhine and the Danube and its tributaries. In Switzerland it has been found more than 2200 feet above the level of the sea. It is also found in the rivers of Siberia and the large fresh-water lakes of Central Asia, and it is said that it is sometimes seen even in India. It always prefers deep streams with clear water, and hence it is not found in small rivers unless they are deep. It generally feeds by night, and by day it lurks under stones or other bodies. It is extremely voracious, and is the terror of all smaller fish, not excepting those of its own species. In Switzerland its flesh is much prized as an article of food, but in England it is not so highly esteemed. Among the Ostiaks the skin of the burbot is used instead of window-glass, and among other Siberian tribes it is used to make coats, shoes, and other articles of clothing.

BURCHIELLO, DOMENICO, an eccentric poet. Of the circumstances of his life we know but little. He lived at the beginning of the fifteenth century, at Florence, where he was probably born. He was the son of a barber named Giovanni, and was called originally only Domenico. He assumed the name of Burchiello afterwards for reasons that cannot be assigned. His fame began about 1425. He was first registered as a barber in 1432. Some writers have reproached him for shameful vices, and represented him as a low buffoon who did everything for money. Others have defended him. His shop was so famous that learned and unlearned, high and low, assembled there every day, and Cosmo the Great caused it to be painted on one of the arches of his gallery. It appears here divided into two portions; in one Burchiello is acting the part of a barber; in the other that of a musician and poet. The portrait of Burchiello himself is painted over his shop. It is extremely difficult to decide upon the absolute value of his satires, as the local and personal allusions in them are obscure. They were composed for his contemporaries, with a studied obscurity and extravagance of expression. His style is, nevertheless, pure and elegant. His burlesque sonnets are enigmas, of which we have no intelligible explanation, notwithstanding what Doni has done. The narrative and descriptive parts are very easy to be understood; but the wit they contain is, for the most part, so coarse, that the satire fails of producing its effect. They are, on the whole, lively, but licentious. The best editions of his sonnets are those of Florence, 1568, and of London, 1757.

BURCKHARDT, JOHANN KARL, one of the first astronomical calculators in Europe, was born at Leipzig, April 30, 1773, and acquired a fondness for astronomy from the study of the works of Lalande. He applied himself particularly to the calculation of solar eclipses, and the occultation of certain stars, for the determination of geographical longitudes. He made himself master, at the same time, of nearly all the European languages. Professor Hindenburg induced him to write a Latin treatise on the Combinatory Analytic Method (Leipzig, 1794), and recommended him to Baron von Zach, with whom he studied practical astronomy at his observatory on the Seeberg, near Gotha, and whom he assisted, from 1795 to 1797, in observing the right ascension of the stars. Von Zach recommended him to Lalande, at Paris, who received him at his house, Dec. 15, 1797. Here he distinguished himself by the calculation of the orbits of comets, participated in all the labours of Lalande, and those of his nephew, Lefrançois Lalande, took an active part in the observatory of the École Militaire, and translated the first two volumes of Laplace's Mécanique Céleste into German (Berlin, 1800–2). Being appointed adjunct astronomer by the board of longitude, he received letters of naturalization as a French citizen, Dec. 20, 1799. His important treatise on the comet of 1770, which had not been visible for nearly thirty years, although, according to the calculations of its orbit, it should have returned every five or six, was rewarded with a gold medal by the Institute in 1800. This treatise, which proposed some improvements in Dr. Olbers' mode of calculation, is contained in the Mem. de l'Institut, 1806. During this year he was made a member of the department of physical and mathematical sciences in the Academy; in 1818 was made a member of the board of longitude, and, after Lalande's death, astronomer in the observatory of the military school. In 1814 and 1816 he published in French, at Paris, Tables to assist in Astronomical Calculations. He also wrote some treatises in Von Zach's Geographical Ephemerides. His labours in the board of longitude were particularly valuable. He died in 1825.

BURCKHARDT, JOHANN LUDWIG, a celebrated traveller, was descended from a respectable family in Bâle, and born at Lausanne in 1784. As he was unwilling to enter into the service of his country, at that time oppressed by France, after having completed his studies at Leipzig and Göttingen, he went to London in 1806, where the African Association wished to make a new attempt to explore Africa, from the N. to the interior, in the way already trodden by Hornemann. They received Burckhardt's proposal to undertake this journey in 1808. Burckhardt now studied the manners of the East, and the Arabian language, in their purest school, at Aleppo. He remained two years and a half in Syria, visited Palmyra, Damascus, Lebanon, and other regions: after which he went to Cairo, in order to proceed with a caravan through the northern part of Africa to Fezzan. In 1812 he performed a journey up the Nile, almost to Dongola; and afterwards, in the character of a poor trader, and a Turk of Syria, proceeded through the deserts of Nubia (where Bruce had travelled before him), under great hardships, to

Berbera and Shendy, as far as Suakin on the Red Sea, whence he passed through Jidda to Mecca. He was now so well initiated into the language and manners of the Arabians, that when a doubt arose concerning his Islamism, after having passed an examination in the theoretical and practical parts of the Mohammedan faith, he was acknowledged, by two learned jurists, not only a very faithful, but a very learned Mussulman. In 1815 he returned to Cairo, and afterwards visited Sinai. Just before the arrival of the long-expected caravan, he died at Cairo, April 15, 1817. The Mohammedans performed his obsequies with the greatest splendour. He had previously sent home all his journals. His last thoughts were devoted to his mother. Burckhardt was the first modern traveller who succeeded in penetrating to Shendy, in the interior of Soudan, the *Meroë* of antiquity (still, as it was 3000 years ago, the depot of trade for Eastern Africa), and in furnishing exact information of the slave-trade in that quarter. He found articles of European fabric, such as the Zellingen sword-blades, at the great fair of Shendy. His Travels in Nubia in 1815 were published in London (1819) by the African Association, with his Researches into the Interior of Africa. In 1822 his Travels in Syria were published, and in 1829 his Travels in Arabia. In 1830 another volume from his papers appeared, entitled Manners and Customs of the Egyptians, 4to.

BURDEN, or BURTHEN.—1. The contents of a ship; the quantity or number of tons which a vessel will carry.—2. The part of a song which is repeated at every verse or stanza is called the *burden of the song*, from the French *bourdon*, drone or bass, because it is both characterized by an unchangeable tone and bears monotonously upon the ear.

BURDETT, SIR FRANCIS, a politician who made a considerable noise in his day, was born in 1770, and educated at Westminster, and after remaining for two years at Oxford, made a continental tour, in which he was accompanied by the celebrated Horne Tooke. In 1796 he obtained a seat in Parliament through the patronage of the Duke of Newcastle, and had Mr. Scott, afterwards Lord Eldon, for his colleague; but he soon abandoned the Tory party, and made himself conspicuous by his zealous advocacy of liberal measures. He subsequently became a candidate for the representation of Middlesex, but lost the election, on which he is said to have expended £100,000. He was more successful in 1807 at Westminster, where he stood at the head of the poll. In 1810 he published a letter in Cobbett's Political Register, denying the right of the House of Commons to imprison for libel, as they had recently done in the case of John Gale Jones. This letter having been brought under the notice of the house was declared a gross breach of its privileges, and a warrant was issued by the speaker for the committal of Sir Francis to the Tower. He denied the legality of the warrant, and declared his determination to surrender only to force. The public mind was strongly agitated, and London was for some days almost in a state of open commotion, which did not subside till several lives had been lost. The prorogation of Parliament relieved him from his imprisonment in the Tower, and his supposed martyrdom in the cause of what was called freedom made him perhaps the most popular man in the kingdom. In attaining this popularity he was greatly aided both by the graces of his appearance and the talents which he undoubtedly possessed. Ultimately, however, as he advanced in life, his fervour cooled, and he owed his last seat in Parliament to the Conservatives of Wiltshire. He died in 1844. Lady Burdett, who had been fifty years married to him, had died only ten days before, and they were both interred on the same day. She was the youngest daughter of Coutts, the banker, whose immense property is now enjoyed by the youngest daughter of Sir Francis, Miss Burdett Coutts.

BURDOCK (*Arctium Lappa*), a species of plants belonging to the natural order Compositæ. It has a branched stem, about 3 feet high, bearing many large, heart-shaped, wavy, coarse leaves, and flower heads, which, when ripe, become so hard and hooked, that they will stick to the hair or clothes, and are known by the name of burs. The whole plant is covered with a clammy, bitter substance, from which circumstance it was called, in old English, the clot-bur, that is, the clothed bur. The root, which is fleshy and tap-shaped, is sometimes used as a diuretic. It is said also to be sudorific and aphrodisiac. As it grows only in deep, rich soils, its prevalence may be regarded as an indication of good land.

BURDWAN, a large town, Hindustan, capital of a district of the same name, on the left bank of the Dummoodah, 50 miles N.W. of Calcutta, with a pop. estimated at 54,000. It belongs, with its district, to the British, to whom it was ceded in 1760, but it has a nominal rajah, who resides here in a spacious palace, with gardens, &c. The chief crops are sugar, indigo, betel, tobacco, cotton, the usual cereal grains of Bengal, and mulberry trees. Coal exists in the district, but the greater part of that commodity which goes under the name of Burdwan is obtained in the adjoining territory of Bankoorah. Fine iron ore is found near the coal, and abundance of stone.

BUREAU, a writing-table; afterwards used to signify the chamber of an officer of government, and the body of subordinate officers who labour under the direction of a chief.—*Bureau system*, or *bureaucracy*, is a term often applied to those governments in which the business of administration is carried on in departments, each under the control of a chief; and is opposed to those in which the officers of government have a co-ordinate authority. Sometimes a mixture of the two systems is found. Thus the business of the executive branch of government may be carried on by bureaux, while the administration of justice is in the hands of co-ordinate judges.—The *Bureau des Longitudes* in France is charged with the publication of astronomical and meteorological observations, the correction of the astronomical tables, and the publication of the Connaissance des Temps, an astronomical and nautical almanac. (See ALMANAC.)

BURG, a town, Prussia, province of Saxony, government and 12 miles N.E. of Magdeburg, on the Ille, surrounded by a wall with several gates. It has three churches, a grammar-school, an hospital, and a workhouse, and is the seat of civil and judicial administration for the circle. Its manufactures are extensive, and consist chiefly of woollens, yarns, linen, pottery, steel, and leather. It has also an iron foundry, dyeworks, tileworks, numerous mills and distilleries, and likewise a pretty extensive trade in hops, chicory, tobacco, cattle, and wool, great numbers of sheep being reared in the vicinity. Pop. in 1871, 15,184.

BURG.—1. ADRIAAN VAN DER, a painter, born at Dordrecht in 1693, studied under Arnold Houbraken, distinguished himself by his portraits, and acquired a reputation which would soon have procured him an independence. But intemperate habits rendered his talents of no avail, and hurried him to a premature grave in 1733. His freedom of touch and fine colouring are his distinguishing excellencies. His best-known pieces are two large pictures at Dordrecht, one of which gives on a single canvas portraits of the managers of the orphan hospital, and the other

portraits of the officers of the mint.——2. JOHANN TOBIAS, a celebrated astronomer, born at Vienna in 1766, attracted the notice of Van Swieten, who was then at the head of the commission appointed to reform the scholastic establishments of Austria, and through his patronage obtained the means of prosecuting the study of mathematics, and more especially of astronomy, for which he showed a decided inclination. In 1791 he became professor of physics at Klagenfurt, and in 1792 was appointed colleague of Trisnecker at the observatory of Vienna. In 1798, the French Institute having proposed a prize for the determination, by at least 500 observations, of the mean height of the apogee and ascending node of the moon, Burg sent in a memoir in which the determination was made by a most accurate and ingenious method, not after 500 but 3000 observations. The tables contained in it were afterwards published by the Institute, and constitute the chief foundation of his fame. In 1813 he became almost entirely deaf, and retired from public life to Wiesenau, in the upper valley of Larau in Carinthia. He died in 1834.

BURGAS, or BOURGAS, a trading town of European Turkey, on the Black Sea, in the government of Roumelia. The bay on which it stands is of sufficient depth for large vessels, and the exports are grain, iron, butter, wine, and also woollen goods for Constantinople. The principal source of the prosperity of the town is the manufacture of pottery, pipe-bowls, cups, &c., for which a superior clay is found in the neighbourhood. Pop. 5000.

BÜRGER, GOTTFRIED AUGUST, a celebrated German poet, was born Jan. 1, 1748, at Wolmerswende, near Halberstadt, where his father was a preacher, and died June 8, 1794, at Göttingen. Before his tenth year he learned nothing but reading and writing, but showed a great predilection for solitary and gloomy places, and began early to make verses, with no other model than that afforded by hymn-books. He learned Latin with difficulty. In 1764 he studied theology at the University of Halle, and in 1768 he went to Göttingen, in order to exchange theology for law, but soon formed connections here equally disadvantageous to his studies and his morals, so that his grandfather, who had hitherto maintained him, withdrew his support from him. The friendship of several distinguished young men at the university was now of great service to him. In union with his friends he studied the ancient classics and the best works in French, Italian, Spanish, and English, particularly Shakspeare, and the old English and Scottish ballads. Percy's Reliques was his constant companion. His poems soon attracted attention. In 1772 he obtained, by the influence of Boie, the small office of baillie in Alten-Gleichen, and, by a reconciliation with his grandfather, a sum for the payment of his debts, which he unfortunately lost, and during the rest of his life was involved in pecuniary difficulties. In 1774 he married the daughter of a neighbouring baillie, named Leonhart, but his marriage was unfortunate. He conceived a violent passion for the sister of his wife, and married her, in 1784, soon after his first wife's death. She also, his celebrated *Molly*, died in the first year of their marriage. At the same time he lost his little property by imprudent management, and was obliged, by intrigues, to resign his place. He was made professor extraordinary in Göttingen, but received no salary, and this favourite poet of the nation was obliged to gain a living for himself and his children by poorly-rewarded translations for booksellers. A third marriage, in 1790, with a young lady of Suabia, who had publicly offered him her hand in a poem, completed his misfortunes; he procured a divorce from her two years afterwards. The government of Hanover afforded him some assistance shortly before his death, which took place in June, 1794, and was occasioned by a complaint of the lungs. In the midst of these misfortunes and obstacles it is astonishing how much he did. He has left us songs, odes, elegies, ballads, narrative poems, and epigrams. In none of these departments does he hold a low rank; in some the public voice has placed him in the first. Schiller criticized him very severely; he denied him the power of idealizing, and reproached his muse as being of too sensual a character. The judgment of A. W. Schlegel seems more just: he says, 'Bürger is a poet of a more peculiar than comprehensive imagination; of more honest and plain than delicate feelings; his execution is more remarkable than his conception; he is more at home in ballads and simple songs than in the higher lyrical poetry; yet, in some of his productions, he appears as a true poet of the people, and his style, with some faults, is clear, vigorous, fresh, and sometimes tender.' The first collection of his poems appeared in Göttingen, 1778. His complete works were first published by Reinhard in 1796–98 (Göttingen, four vols.), whose edition has been repeatedly published since. Other editions of his works and letters have also been published, and his life has been written by Döring, Pröhle (G. A. Bürger. Sein Leben und seine Dichtungen, Leipzig, 1865), and others.

BURGESS, in England, the holder of a tenement in a borough: in a parliamentary sense, the representative of a borough; in Scotland, a member of the corporation of a burgh. Before the North American revolution, the popular branch of the legislature in Virginia was called the *house of burgesses;* it is now called the *house of delegates.*

BURGH, the Scotch term corresponding to the English 'borough,' and applied to several different kinds of corporations, and to towns and cities in Scotland. The different kinds of burghs that still exist, or formerly existed in Scotland, are 'royal burghs,' 'burghs of barony,' 'burghs of regality,' 'free burghs,' 'parliamentary burghs,' and 'police burghs.' The last two have been created in comparatively recent times.

ROYAL BURGH. A royal burgh is a corporate body erected by a charter from the crown. The corporation consists of the magistrates and burgesses of the territory erected into the burgh. The magistrates are generally, a provost and bailies, dean of guild, treasurer, and common council. With regard to the method of electing councils, the 'close system' formerly prevailed, until it was abolished by 3 and 4 Will. IV. cap. lxxvi. This system existed by right of an enactment made in 1469, which gave to the old councils the privilege of electing their successors, and which also decreed that the office-bearers of the town, as aldermen, bailies, dean of guild, &c., should be elected by the members both of the old and the new council, in conjunction with a number of persons belonging to the several crafts of the burgh, each of whom was elected as their representative by the craft to which he belonged, one for each craft. This system, however, was not universally adopted, and the 'setts,' or constitutions of the burghs exhibited an almost endless variety in their details, but all of them agreed in the essential principle of the close system, that of self-election. The act mentioned above, which abolished this system, substituted for it a popular mode of election, according to which every one is entitled to vote in the election of councillors, who has resided for six calendar months next previous to the last day of June, within the royalty, or within 7 miles of it, and who is qualified to vote in the election of the member of Parliament. In those burghs which do not now send or contribute to send members to Parliament, the same qualification is

required to entitle one to vote in a municipal election as is required in those which do return members to Parliament. The number of councillors in each burgh remains the same as the number which constituted the common council, by the sett or constitution of the burgh, as it existed when the act was passed, and where this was variable, the smallest number was to constitute a council. The electors of the following eight burghs—Edinburgh, Glasgow, Aberdeen, Dundee, Perth, Dunfermline, Dumfries, and Inverness, are divided into wards or districts, each of which is represented by a certain number of members in the council. By the Municipal Elections Act of 1868, it was further enacted that any royal burgh having, by the last census, a pop. of more than 10,000 persons, and not divided into wards, might, by a majority of two-thirds, resolve that the burgh should be divided into wards, for the purpose of parliamentary and municipal elections. At the first election after the passing of the act 2 and 3 Will. IV. cap. lxxvi., a complete council was erected by each burgh, but as the terms of the act required that a third part of the members should retire every year, the same proportion of members must now be annually elected. There is no bar to the re-election of an outgoing councillor. In addition to the members of council thus elected, the deans-of-guild and deacons-conveners of the trades in Edinburgh, Glasgow, Aberdeen, Dundee, and Perth, are constituent members of the town-councils of these burghs. Upon the third lawful day after an election of councillors, the office-bearers of the burgh are elected by the councillors, by a plurality of voices, the first attending councillor having a casting vote in cases of equality. Vacancies taking place during the year, by death or resignation, are supplied, *ad interim*, by the remaining members of council, but those who are thus chosen only hold office till the next election of councillors. The magistrates and council possess the same powers of administration and jurisdiction as was enjoyed by the magistrates and town-council before the passing of the act. An annual convention which meets at Edinburgh, and is composed of commissioners from each of the royal burghs, has power to make regulations for promoting the trade and commonweal of the burghs, and also to inquire how the revenues have been applied, although it has no power to call the magistrates to account for the administration of the revenue.

At the union of England and Scotland there were seventy royal burghs in Scotland, but four of them were not included in the classes of burghs then formed to send representatives to the British Parliament, and the number was thus reduced to sixty-six. There are now sixty-four royal burghs sending representatives to Parliament, and two which do not send representatives to Parliament.

BURGHS OF BARONY are corporations analogous to royal burghs, consisting of the inhabitants of certain tracts of ground within the barony erected by the king, and subject to the government of the magistrates, who are elected either by the superior of the barony, or by the inhabitants themselves, according to the terms of the charter of erection.

BURGHS OF REGALITY were a kind of burghs of barony which had regal or exclusive jurisdiction within their own territority. As hereditary jurisdiction is now abolished, there is now nothing of any practical importance to distinguish this class of burghs from the previous class.

FREE BURGHS were burghs of barony which enjoyed, by crown charter, rights of trade both home and foreign, but which at the same time had to bear certain public burdens as the price of their privileges. These burghs no longer form a distinct class, since there are now no commercial monopolies, and, accordingly, no rights of trade peculiar to any class of burghs.

PARLIAMENTARY BURGHS are such as, not being royal burghs, send representatives to Parliament under the provisions of the Reform Acts 1 and 2 Will. IV. cap. lxv., and 31 and 32 Vict. cap. xlviii. There are fifteen of these, namely, Airdrie, Cromarty, Falkirk, Galashiels, Greenock, Hamilton, Hawick, Kilmarnock, Leith, Musselburgh, Oban, Paisley, Peterhead, Port-Glasgow, and Portobello. The mode of election of councillors and magistrates of parliamentary burghs is the same as in royal burghs. The clause of the Municipal Elections Act of 1868, referring to the division into wards of such burghs as had more than 10,000 inhabitants at the census of 1861, applies to parliamentary as well as to royal burghs.

POLICE BURGHS. In the act for regulating the police of towns and populous places in Scotland (13 and 14 Vict. cap. xxxiii.) the word 'burgh,' as used in the act, is defined to mean not only royal burgh, but any populous place, the boundaries of which have been ascertained in terms of the act.

BURGHERS. See SECESSION.

BURGKMAIR, HANS, a painter and engraver, born at Augsburg in 1474, is supposed to have been a pupil of Albert Dürer. Several of his frescoes and paintings in oil upon wood are still preserved in his native town; but though possessed of considerable merit, they have contributed far less to his fame than his woodcuts, in which he at least equalled Dürer, and has scarcely been surpassed by Holbein. He is supposed to have died in 1559.

BURGLARY (supposed to be derived from the German *bury*, a house, and *larron*, a thief, from the Latin *latro*) is defined to be a breaking and entering the dwelling-house of another, in the night, with intent to commit some felony within the same, whether such felonious intent be executed or not. This is the modern signification of the term, which formerly applied also to the breaking into a church, fort, or town: and the breaking into a church is said, by Sir Edward Coke (3 Inst. 64), to be, undoubtedly, burglary. Both breaking and entering are considered necessary to constitute the offence. The opening a door or window, picking a lock, or unlocking it with a key, raising a latch, or loosing any fastenings, constitutes a *breaking*. Likewise, knocking at the door, and, on its being opened, rushing in, has been so considered. So, if a lodger in the same house open and enter another's room; or if a servant conspire with a robber and let him into the house, it will be such a breaking of a house as, if done with intent to commit a felony, will be burglary. The breaking and entering must, however, be in the night, to make it burglary. At one time lawyers differed much as to the precise meaning of the term *night*, but all doubt on this subject has been removed by statutes 7 Will. IV., and 24 and 25 Vict. cap. xcvi. s. 1, which fixes the duration of night from 9 o'clock p.m. to 6 o'clock a.m. The breaking open of a barn, shop, shed, or other building is not burglary, unless it be apurtenant to a dwelling-house. A chamber in a college, or in the London inns of court, is, for this purpose, considered to be a dwelling-house. The statute 7 and 8 Geo. IV. cap. xxix., made the punishment death; and this statute, pursuing that of 12 Anne cap. vii., made the committing a felony in a house, and breaking out of it by night, burglary. This statute of Geo. IV. also altered the definition of the crime, by substituting *dwelling* for *mansion house*. It also defined what should be considered as part of the house, saying, that no building within the same curtilage, and occupied with the dwelling-house, should be deemed a part of it for this purpose, 'unless there

shall be a communication' with the house, 'by means of a covered and inclosed passage.' This provision cleared up a doubt that had hung over the former law. This act also provided (s. 12), that 'if any person shall *break and enter* a house and steal,' &c., or shall steal any property in any dwelling-house, any person *therein being put in fear*,' or 'shall steal to the value of £5,' he should suffer death. By more recent statutes (24 and 25 Vict. cap. xcvi. s. 52) burglary is made punishable by penal servitude for life, or for any period not less than three years, or by imprisonment.

BURGOMASTER, the name of the chief magistrates of large towns in the Netherlands and Germany. Their number and term of office are different in different places. They are sometimes chosen for life, sometimes for a fixed period. They preside in the municipal councils, &c. The same officer in France is called *maire;* in England and the cities of North America, *mayor;* and in Scotland, *provost.*

BURGOS, a city of Spain, the capital of Old Castile, and once the residence of its kings. It stands on the declivity of a hill, on the right bank of the Arlanzon. The streets are narrow and dark. The finest street in every respect is that called the Huerto del Rey. All the streets have good side pavements. Places of promenade are numerous; but the one most frequented, and justly forming the boast of the town, is the Espolon, which is laid out in spacious walks, and has a fine vista leading to the Arlanzon. The most remarkable structure is the cathedral, one of the finest buildings of the kind, not only in Spain, but in Europe. It was commenced in 1221 on the site of a royal palace which Ferdinand III. gave up for the purpose; but was not finished for several centuries. It is built of white marble in the form of a Latin cross, and is about 300 feet long by 200 broad. It is so large that service can be performed in eight chapels at once without confusion. Its interior as well as its exterior is of great magnificence, is adorned with fine carvings and paintings, and contains numerous monuments, in particular the tombs of Don Fernando and the Cid, both natives of Burgos, and celebrated throughout Spain for their heroic achievements in the wars with the Moors. Of the other numerous churches San Lorenzo, one of the largest, has a front of Corinthian pillars, and an interior of a circular form lighted from above by a handsome dome. None of the other public buildings are deserving of notice. The beneficent and educational establishments of Burgos are numerous. The wool of Old Castile passes principally through Burgos, and it has some woollen manufactures. Before the removal of the court to Madrid, Burgos was in a very flourishing condition, and contained thrice its present population. Since then it has continued to sink gradually, and exhibits in every quarter indications of decay. Pop. 25,721. The province of Burgos is bounded on the N. by Santander, E. by Alava, Logroño, and Soria; S. by Segovia, and W. by Palencia and Valladolid. The area is 7082 square miles, and the pop. in 1867 was 357,846.

BURGOYNE, JOHN, an English general officer and dramatist. He was the natural son of Lord Bingley, and entered early into the army. In 1762 he commanded a force sent into Portugal for the defence of that kingdom against the Spaniards. He also distinguished himself in the American war by the taking of Ticonderoga, but was at last obliged to surrender with his army to General Gates at Saratoga. On his return to England he was ill received, the disaster to the British arms being laid to his charge. He published some pamphlets in defence of his conduct, and threw up all his appointments. He was afterwards restored to his rank in the army. He is the author of The Maid of the Oaks, Bon Ton, The Heiress, &c., all in the line of what is usually called *genteel comedy*, of which they form light and pleasing specimens. He died June 4, 1792.

BURGOYNE, SIR JOHN FOX, son of the above, an eminent officer of engineers, was born 24th July, 1782. He entered the royal engineers in 1798; served at Malta in 1800, in Sicily with General Stewart in 1806, in Egypt in 1807, and in the Peninsula with Sir John Moore and Wellington from 1809 to 1814. He shared in the celebrated retreat on Corunna, and was present at all the sieges, generally as first or second in command of the engineers, and at most of the battles of the Peninsular war, in which he was twice wounded. In 1815 during the American war he assisted as lieutenant-colonel and chief engineer in the unsuccessful attack on New Orleans. In 1826 he accompanied the army of General Clinton to Portugal in the same capacity. He was appointed chairman of the Board of Public Works in Ireland in 1830, and in 1845 became inspector-general of fortifications in England. He was made a lieutenant-general in 1851, and on the outbreak of the Crimean war was sent to Turkey to provide for the defence of Constantinople. After returning to England he was again sent out to Sebastopol, where he was chief of the engineering department till recalled in 1855. He received the order of the Medjidie from the Sultan of Turkey, was made a general, and the following year (1856) was created a baronet. In 1868 he was made a field-marshal. At his death, which took place Oct. 7, 1871, he had been for some years Constable of the Tower of London.

BURGUETTA, or ELBURGUETTA, a town of Spain, 24 miles N.E. of Pampeluna, in the valley of Roncesval, where the rear-guard of Charlemagne's army was defeated by the Saracens, and the famous Roland slain, A.D. 778.

BURGUNDIANS. The Burgundians (called by the ancients *Burgundi* and *Burgundiones*), one of the principal branches of the Vandals, can be traced back to the country between the Oder and the Vistula in what is now the New Mark, and the southern part of West Prussia. They were distinguished from the other Germans by living together in villages, *burgen* (whence, perhaps, they received the name of *Burgundians*). The others lived separately, and led a more wandering life. This is probably the reason why they retained possession of their country much longer than the neighbouring Goths and Vandals, till at length they were no longer able to withstand the Gepidæ, who pressed in upon them from the mouths of the Vistula. In consequence of the loss of a great battle with the Gepidæ they emigrated to Germany, where they advanced to the region of the Upper Rhine, and settled near the Allemanni. From them they took a considerable tract of country, and lived in almost continual war with them. In the beginning of the fifth century with other German nations they passed over into Gaul. After a long struggle and many losses, they succeeded in obtaining possession of the south-eastern part of this country by a contract with the Romans. A part of Switzerland, Savoy, Dauphiny, Lyonnais, and Franche-Comté belonged to their new kingdom, which even in the year 470 was known by the name of *Burgundy*. The seat of government seems to have been sometimes Lyons, and sometimes Geneva.

By their old constitution they had kings called *hendinos*, whom they chose and disposed at their pleasure. If any great calamity befel them, as a failure of the crops, a pestilence, or a defeat, the king was made responsible for it, and his throne was given to another, under whom they hoped for better times. Before their conversion to Christianity (which hap-

pened after their settlement in Gaul), they had a high-priest called *sinestus*, whose person was sacred, and whose office was for life. The trial by combat even then existed among them, and was regarded as an appeal to the judgment of God. Continually endeavouring to extend their limits, they became engaged in a war with the Franks, by whom they were at last wholly subdued, under the son of Clovis, after Clovis himself had taken Lyons. They still preserved their constitution, laws, and customs for a time. But the dignity of king was soon abolished, and under the Carlovingians the kingdom was divided into provinces, which from time to time shook off their dependence. In 879 Boson, count of Autun, brother-in-law of King Charles the Bald, and duke of Milan, with the assent of the Burgundian nobles, succeeded in establishing again the royal dignity in this kingdom. He styled himself *King of Provence*. His residence was at Arles, and hence is derived the name *kingdom of Arles*. He was deprived of several provinces by Louis and Carloman; but his son Louis added to his hereditary possessions the country lying beyond the Jura, and thus established the kingdom of Burgundy, Cis-Jurana, or Lower Burgundy, which included a part of Provence, with Arles, Dauphiny, Lyonnais, Savoy, and a part of Franche-Comté. A second kingdom of Burgundy arose when the Guelph, Rodolph von Strettlingen (duke of Swiss Lorraine) gained possession of the rest of Lorraine, namely, Switzerland beyond the river Reuss, the Valais, and a part of Savoy, and in short all the provinces between the Jura and the Pennine Alps, and caused himself in 888 to be crowned King of Upper Burgundy (*regnum Burgundicum Transjuranum*). Both Burgundian kingdoms were united about the year 930, and after the race of Rodolph became extinct (1032) were incorporated with Germany under the Emperor Conrad II. But a third state, which had its origin about the same time with Upper Burgundy, consisting principally of the French province Bourgogne (*Burgundy*, properly so called), and the founder of which is said to have been Richard, brother of Boson (first king of Lower Burgundy), maintained its independence. From Ludegardis, grand-daughter of Richard, and her husband Otho, a brother of Hugh Capet, sprang the ancient Dukes of Burgundy (Bourgogne). They became extinct in 1361 with the death of Duke Philip, and Burgundy was immediately united by King John of France with the French crown, partly as a fief of the kingdom, and partly because his mother was sister of the grandfather of the last duke. The dignity of Duke of Burgundy was restored in 1363 by his grant of those domains under the title of a dukedom as an appanage to his youngest and favourite son, Philip the Bold. Philip was the founder of the new line of the Dukes of Burgundy. In 1368 he married Margaret, the widow of the last Duke of Philip of the old line, only daughter and heiress of Louis III., count of Flanders. This marriage greatly augmented his possessions. At that time Flanders, Mechlin, Antwerp, and Franche-Comté fell to him. In 1402 he was made regent of France on account of the sickness of Charles VI. Louis, duke of Orleans, brother of the king, being obliged to yield to him this dignity, conceived a bitter hatred against him. This was the occasion of the famous division of the French into the Orleans and Burgundian parties. In 1404 Philip died, and was succeeded by his son, John the Fearless. Orleans now became regent of France. But both cousins remained bitter enemies till, under the walls of Montfaucon, at the commencement of a civil war (1405) they embraced each other in the sight of the whole army, and as a pledge of entire reconciliation slept in the same bed the following night. Nevertheless, Orleans was assassinated in the street in 1407, and Duke John of Burgundy declared himself the author of the deed, which was the melancholy cause of the greatest disturbances in Paris. John indeed obtained a letter of pardon from the king; but justice overtook him as he was about to repeat the farce of a public reconciliation with the dauphin on the bridge of Montereau. While the first words of salutation were passing between them, he was stabbed by the companions of the dauphin (1419). His son and successor, Philip, surnamed the Good (previously Count of Charolais), in the peace which was concluded between England and France and Burgundy (1420), succeeded in effecting the exclusion of the dauphin as a punishment for the murder of Duke John. In the reign of Philip happened his memorable dispute with Jacqueline of Brabant and her second husband the Duke of Gloucester, which was settled by a treaty, by virtue of which Philip was to become the heir of Jacqueline (if she died childless), and she was not to marry without his consent. But Jacqueline violated this last stipulation (1430), and Philip took possession of her territories, Hainault, Holland, and Zealand, setting aside a small portion for her maintenance. The year before Philip had purchased Namur, and in 1431 Brabant and Limburg reverted to him, when the line of Anthony of Burgundy, second son of Duke Philip the Bold, became extinct. In the peace with France (Arras, 1435), it was stipulated that King Charles VII. should sue for pardon on account of the murder of John, and that Philip should receive from France the valuable districts of Macon, St. Gengou, Auxerre, and Bar-sur-Seine for himself and his lawful male and female heirs; Peronne, Mondidier and Roye for his lawful male heirs; and further, St. Quentin, Corby, Amiens, Abbeville, Ponthieu, Dourlens, St. Riquier, Crevecœur, Arleux, and Mortagne, and the county of Boulogne, for himself and his heirs. To these important possessions he added also in 1441 the Duchy of Luxemburg. In 1430 Philip had contracted a third marriage, as his two former wives had borne him no children. On his marriage with Isabella, daughter of King John of Portugal, he founded the order of the Golden Fleece. Three sons sprang from this marriage, of whom the two first soon died. The third, Charles Count Charolais, after the death of Philip (at Bruges, July 16th, 1467), became Duke of Burgundy. (See CHARLES THE BOLD). He acquired Gueldres in 1475, and left behind him in 1477 a daughter, Maria, the sole heiress of his states. Seven princes were her suitors, among whom were the dauphin of France and Maximilian of Austria. The last obtained her hand, with the Netherlands and Upper Burgundy (Franche-Comté). The King of France received of the Burgundian territory nothing except the cities in Picardy and the dukedom of Burgundy, which he assumed as being a male fief. Maria died in her twenty-fifth year, in consequence of a fall, leaving three children, Philip, Margaret, and Francis (who died soon after). The Burgundian provinces refused to recognize Maximilian as the guardian of his children. He betrothed his daughter to the dauphin Charles, with the county of Artois and Burgundy, together with the Maconnais, Auxerrois, Salins, and Bar-sur-Seine as her dowry. But his object, which was wholly to pacify the provinces, was not attained. The people of Flanders were particularly obstinate, and they went so far that Maximilian, two years after his election as King of the Romans (1488), was retained a prisoner at Bruges for more than three months. Finally, the people of Flanders acknowledged him as guardian of his son Philip, and regent of the government. In the peace of Madrid, in 1526, Francis I. was obliged to agree to the cession of the duchy of Burgundy to Charles V.

of Germany, but the cession was never carried out, and in the peace of Cambray, in 1529, Charles renounced his claim to it. Franche-Comté was conquered by Louis XIV., and retained by him at the peace of Nimeguen in 1678. Since that time the Burgundies have never been separated from France. The baron Barante, peer of France, published at Paris in 1824, in ten volumes, a Histoire des Ducs de Bourgogne de la Maison de Valois (1364–1477).

BURGUNDY (called also *Burgundy Proper* or *Lower Burgundy*), formerly a province in the E. of France, lying on the W. of Franche-Comté, and on the S. of Champagne. It was divided into the duchy of Burgundy and four counties. It now forms the four departments of Yonne, Cote-d'Or, Saône-et-Loire, and Ain, containing, according to the preliminary returns of the census of 1872, 1,699,752 inhabitants. It is watered by a number of navigable rivers. The Central Canal joins the Loire with the Saône (*Canal du Centre*, 72 miles long), and another (217 miles long) joins the Rhône with the Rhine. Burgundy is one of the most productive provinces in France. The plains are rich in arable land, the sides of the hills are covered with vineyards and fruit-trees, while the summits abound in pastures, wood, and game. The principal product is wine. (See BURGUNDY WINES.) Iron ore and other minerals are found in the mountains. See BURGUNDIANS.

BURGUNDY, Circle of, one of the four circles of the German Empire, which were added in 1512 by Maximilian I. to the six already formed by him. At first it comprised the Franche-Comté and the seventeen provinces of the Netherlands. The seven Dutch provinces having declared themselves independent (1579), and the Franche-Comté being ceded to the French by the peace of Nimeguen (1678), the Spanish or Austrian Netherlands alone composed the circle.

BURGUNDY WINES are produced in the former provinces of Upper and Lower Burgundy (which see), in a soil of a light black or red loam, mixed with the *débris* of the calcareous rock on which it reposes. In richness of flavour and perfume, and all the more delicate qualities of the juice of the grape, they are inferior to none in the world. It is to the great skill with which the cultivation of the vine and the fermentation of the liquor are managed, that they owe those generous qualities which gave to the Dukes of Burgundy the title of *princes de bons vins*, and which, as Petrarch more than hints, contributed not a little to prolong the stay of their holinesses at Avignon. They are remarkable for their spirituosity and powerful aroma, and are, therefore, more heating than some other wines which contain more alcohol. The exhilaration they produce is, however, more innocent than that resulting from heavier wines. The finer wines of Burgundy do not bear removal except in bottles, and as they are not produced in great abundance, they are rarely if ever met with in foreign countries. It is the inferior growths which are sold under that name. The Burgundy wines are generally exported between January and May, chiefly in double casks. They keep only four or five years, and are very apt to acquire a bitter taste. This may sometimes be partially removed by new sulphuring and fining. The most numerous are the red wines of Burgundy. The finest growths of these are the Romanée-Conty, the Chambertin (the favourite of Louis XIV. and Napoleon), the Clos-vougeot, the Richebourg, the Romanée de St. Vivant, &c. They are distinguished for their beautiful colour and exquisite flavour and aroma, combining more than any other wines lightness and delicacy with richness and fulness of body. Of the second class are the *vins de primeur*, of which the Volnay and Pomard are the best; those of Beaune, distinguished above all by their pure flavour, and formerly considered the most choice of the Burgundy wines; the Macon wines, remarkable for their strength and durability; those of Tonnerre and Auxerre, &c. The white wines of Burgundy are less numerous but not inferior in aroma and flavour. The famous Montrachet is equal to the finer red wines, and is distinguished for its agreeable nutty flavour. Of the second class are the *Goutte d'or*, so called from the splendour of its tint; La Perrière, &c. See Jullien's Classification des Vins and Henderson's Ancient and Modern Wines.

BURHAMPORE, or BOORANPOOR, a town in Hindustan, in the presidency and province of Bengal, 5 miles S.W. of Moorshedabad, on the Bhagirutti. It is the seat of a civil establishment, consisting of the usual European and native functionaries; and beside many stately houses in its vicinity, giving it an air of grandeur and importance, has splendid military cantonments, in which the quarters of the European officers, composed of long ranges of edifices built of brick and stuccoed, and the grand square, inclosing an excellent parade-ground, have an attractive appearance. It was once extremely unhealthy, but is said to have been so much improved by sanitary measures, as to be second to no locality in Bengal for salubrity.

BURIAL. Great care should be taken not to bury the body too soon after death. The ancient nations endeavoured to satisfy themselves by many precautions that death had really taken place. The ancient Egyptians embalmed their dead; the Romans cut off one of their fingers before they burned them; other nations repeatedly washed and anointed them. Interments should never be allowed before the most undoubted symptoms of putrefaction have taken place. In many cases it is troublesome, and even dangerous, to keep the body long, as in case of contagious diseases or of want of room. In many places, to obviate this inconvenience, houses are erected where the corpse is brought a few hours after the decease. See TRANCE and BURYING-PLACES.

BURIATS, BURATS, or BURATTI. This nomadic Tartar nation consists of seventy-seven tribes. They submitted to the Russian sceptre in 1644, and form the second principal branch of the Kalmucks. They rove about in the southern part of the government of Irkutsk. Their number is from 150,000 to 200,000. They are expert in all bodily exercises, and are especially good horsemen and archers. They choose their own princes (*taijis*) and elders (*shulengas*), but their choice has to be confirmed by the government of Irkutsk. They support themselves by their flocks, by hunting, and the mechanical arts, particularly the forging of iron. Their dress consists of leather, bordered with fur, and ornamented with lacings.

The Buriats protect their huts, which are hexagonal or octagonal, from heat and cold by covering them with leather. These huts they call *yurts*. The religion of this people is partly Lamaism and partly Shamanism. They call their supreme god *Octoryon Burchan*, or *Tingiri Burchan* (God of Heaven). The planets are inferior gods; and the chief of the evil spirits is called *Ockodol*. The idols of Lamaism, like those of Shamanism, are sometimes painted on cloth, and sometimes made of wood, metal, felt, and sheepskin. The smoke of the yurts make the idols, disgusting in themselves, still more disgusting. The worshippers of the Grand Lama have this peculiarity, that male forms are the basis of their idols. As the female sex in this nation is considered unclean, they may not approach the place where the household gods are arranged. The male Buriats always burn incense, to purify any place where a woman has been sitting, before they sit there themselves. The poor Buriats sometimes go over to the Greek Church, but continue

to use their old ceremonies in reference to their new objects of worship. Several of the Buriats have gained some reputation in science.

BURIDAN, JEAN, a scholastic philosopher of the fourteenth century, born at Béthune, in the county of Artois, studied at Paris, where he attached himself as a disciple of Occam to the party of the Nominalists, and at a later time became himself a teacher. In the end he was forced by his opponents to flee from Paris, when he betook himself to Vienna, where he is said to have been influential in bringing about the establishment of the university of that town. Here also he wrote some logical and ethical treatises, in which he appears as a zealous adherent of the Aristotelian philosophy. In his logic he gives certain rules to facilitate the discovery of the middle term in a syllogism, from which the book received the name of the 'Asses' Bridge.' Buridan was a supporter of the doctrine of Determinism (that is, the doctrine that every act of volition is determined by some motive external to the will itself), and he is now chiefly known through having his name attached to an illustration that he is said to have used in support of his views, and which is known as 'Buridan's Ass.' He is said to have supposed the case of a hungry ass placed at an equal distance from two equally attractive bundles of hay, and to have asserted that in the supposed case the ass must inevitably have perished from hunger, there being nothing to determine him to prefer the one bundle to the other. This illustration, however, is not found in any of his works, and from its nature it would appear more likely to have been used by the assailants of the doctrine of Determinism, in order to ridicule the views of Buridan, than to have been used by Buridan himself in support of his views. Buridan died after 1358, at the age of sixty.

BURIGNY, JEAN LEVESQUE DE, born at Rheims in 1692, went to Paris in 1713, where he became a hard student, and by the aid of a prodigious memory made himself well acquainted with Greek, Latin, and Hebrew, ancient and modern history, philosophy, theology, &c. From Paris he went to Holland, and during a residence of two years, from 1718 to 1720, wrote nearly the half of the twelve volumes forming the work called Europe Savante. After his return to France he was admitted a member of the Academy of Inscriptions and Belles-Lettres in 1756, and continued from that period to publish a long series of works almost without interruption till his death in 1785. He had then attained the unusual age of ninety-four. He possessed his faculties unimpaired to the last, and before expiring thus expressed himself to his friends: 'Had I ever doubted the immortality of the soul, my present state would have convinced me of my error. I have no feeling in my body; I cannot move it. I am no longer sensible of its existence; and yet I think, I reflect, I will, I exist. Dead matter cannot perform such operations.' His most esteemed works are A General History of Sicily, in two vols. 4to; a Life of Grotius, and a Life of Erasmus.

BURIN, or GRAVER, an instrument of tempered steel, used for engraving on copper. It is of a prismatic form, having one end attached to a short wooden handle, and the other ground off obliquely, so as to produce a sharp point. In working, the burin is held in the palm of the hand, and pushed forward so as to cut a portion of the copper. The expressions *brilliant* burin, *soft* burin, are used to characterize the manner of a master. See ENGRAVING.

BURKARD WALDIS, a fabulist of the sixteenth century, was born at Allendorf, on the Werra. In his earlier years he was a monk. After having travelled over Europe, he became a zealous Protestant, and died about 1555, in the office of preacher at Abterode. His Æsop, in rhyme, contains 400 fables and amusing stories, partly from Æsop and other fabulists and novelists, partly original. They are written in a strain of happy humour and well-directed satire, and in an easy and often peculiar style. Eschenburg published a collection of them in 1776. A complete edition of his Æsop, with an introduction and notes by Heinrich Kurz, was published at Leipzig in 1862.

BURKE, EDMUND, a writer, orator, and statesman of great eminence, was born in Dublin, Jan. 1, 1730. His father was an attorney of reputation, and he received his education under Abraham Shackleton, a Quaker, at Ballitore. In 1744 he was entered at Trinity College, Dublin, as pensioner, where he chiefly occupied himself with a plan of study of his own, the principal objects of which were the classics, logic, metaphysics, morals, history, rhetoric, and composition. He left Trinity College, after taking a bachelor's degree, in 1749; and not much is recorded of this period of his life, except that he made an unsuccessful application for the professorship of logic at Glasgow. At this period he had planned a refutation of the metaphysical theories of Berkeley and Hume. In 1750 he first entered the great theatre of London as a law student at the Temple, where he soon became the admiration of his intimates, for the brilliancy of his parts, and the variety of his acquisitions. Applying more to literature than to law, he supported himself by his pen, and by intense occupation brought himself into a state of ill-health. This illness, by making him a guest of Dr. Nugent, an eminent physician, led to his marriage with that gentleman's daughter. In 1756 he published, without a name, his first work, entitled A Vindication of Natural Society, in a Letter to Lord ——, by a noble Lord. This work exhibited so complete an imitation, although ironical, of the style of Bolingbroke, that many persons were deceived by it, not perceiving Burke's intention to prove that the same arguments with which that nobleman had attacked religion might be applied against all civil and political institutions whatever. In the same year he published his Essay on the Sublime and Beautiful. The elegance of its language, and the spirit of philosophical investigation displayed in it, introduced the author to the best literary acquaintance. In 1758 he suggested to Dodsley the plan of the Annual Register, and took upon himself the composition of the historical part, which he continued for a number of years. He was thus gradually forming himself for a statesman. His political career may be said to have commenced in 1761, when he went to Ireland as confidential friend to William Gerard Hamilton, then secretary to the lord-lieutenant, Lord Halifax. For his services in this unofficial capacity he was rewarded with a pension of £300 per annum on the Irish establishment. On his return, in 1765, he was introduced to the Marquis of Rockingham, then first lord of the treasury, who made him his private secretary; and through the same interest he entered Parliament as member for Wendover. The marquis also made him a nominal loan, but real gift, of a large sum, which placed him in easy circumstances, and enabled him to purchase his elegant seat near Beaconsfield. His first speech in Parliament was on the Grenville Stamp Act; and it was at his advice that the Rockingham administration took the middle and undecided course of repealing the act, and passing a law declaratory of the right of Great Britain to tax America. This ministry was soon dissolved, to make room for a new cabinet, under Pitt. Burke concluded his official labours by his pamphlet entitled Short Account of a Late Short Administration. In the proceedings against Wilkes he joined the remonstrants against the violation of the rights of election, and in

1773 published his Thoughts on the Causes of the present Discontents, the sentiments of which are consistent with his future doctrines and conduct. He opposed the ministerial measures antecedent and consequent to the American war; and the whole powers of his eloquence were exerted, first to prevent, and then to heal the fatal breach between the mother country and her colonies. In 1774 he was chosen member for Bristol; and it is to his credit that he subsequently ventured to give offence to his Bristol friends, by his support of the Irish petitions for free trade, and for moderating the penal statutes against the Roman Catholics. He soon, however, recovered all the ground thus lost by his famous reform bill, which he unsuccessfully advocated with an extraordinary union of wit, humour, and financial detail. In 1783 Lord North's ministry was dissolved; and on the return of the Marquis of Rockingham and his party to power, Burke obtained the lucrative post of paymaster-general of the forces, and a seat at the council board. He also embraced the auspicious opportunity to reintroduce his reform bill, which passed, but not without considerable modifications. On the death of the Marquis of Rockingham, and the succession of Lord Shelburne, Burke resigned, and joined the coalition. The India Bill formed the ostensible cause for dismissing this ill-judged combination; and Pitt succeeded to the helm, and dissolved the Parliament. The next great political event in his life was his share in the prosecution of Warren Hastings, which trial, indeed, originated with him. The Report of the Committee on the Trial of Warren Hastings, 1794, was by Burke. His conduct in this affair gained him little in the public estimation, except increased fame as an orator. On the settling of the regency in 1788 he argued against the principle of the ministers, that the regency was elective, and not hereditary. The last great act of his political life was the part he took in the French revolution. He early manifested his dislike to it, and in 1790 loudly condemned the principles and conduct of the revolutionists. His famous Reflections on the Revolution in France appeared in the following October; and no work ever attracted more attention, or produced more effect. It exhibits both the merits and defects of the writer, and contains much justness of argument, profundity of observation, and beauty of style; but it is equally obvious that he commits the very fault which he intended to reprobate in his Vindication of Natural Society, by making his arguments applicable to the defence of all establishments, however tyrannical, and censure of every popular struggle for liberty, whatever the oppression. It had an unprecedented sale, and obtained unbounded praise from all who trembled for establishments, or were alarmed at the odious character which the French revolution was beginning to assume. On the other hand, it met with severe and formidable critics and opponents, and, among other things, produced the celebrated Rights of Man, of Thomas Paine, and the Vindiciæ Gallicæ, of Sir James Mackintosh. Burke followed up this attack with a Letter to a Member of the National Assembly (1791); an Appeal from the New to the Old Whigs; Letter to a Noble Lord on the Subject in Discussion with the Duke of Bedford (1796); Letters on a Regicide Peace, &c. In all these productions he displayed unabated powers of mind. In 1792 he published a Letter to Sir Hercules Langrishe, on the Propriety of admitting Roman Catholics to the Elective Franchise, and in 1794, withdrew from Parliament, and was succeeded in the representation of Malton by his only son, whose death soon after hastened the decline of nature which he was beginning to experience. Decay, by gradual approaches, terminated his life on July 8, 1797, in the sixty-eighth year of his age. He preserved his senses to the last; and a few hours before he died he had read to him Addison's paper in the Spectator, on the immortality of the soul. Amiable in private life, and exemplary in his domestic and social relations, he was greatly beloved by his friends. His conversation was delightful and instructive. He was exceedingly charitable and beneficent, and founded a school for the children of French emigrants, the permanent support of which formed one of his latest cares. His public character will be best collected from a study of his political career, and his powers of mind from his publications. His oratory was pre-eminently that of a full mind, which makes excursions to a vast variety of subjects, connected by the slightest and most evanescent associations, and that in a diction as rich and varied as the matter. In delivery, however, the effect of his speeches was by no means proportioned to their absolute merit; their length, their copiousness, abundance of ornament, and wide field of speculation, producing impatience in men of business absorbed in the particular subject of debate; added to which, his manner was indifferent, his voice harsh, and his action, though forcible, inelegant. On the whole, though the greatest genius, he was by no means the most effective orator in the House of Commons. A handy edition of his works is that of Bohn, eight vols., with life by James Prior in one: see also Macnight's Life and Times of Edmund Burke (three vols. 1858–60).

BURKING, a species of murder by suffocation, which derives its name from William Burke, a native of Ireland, who, in 1828–29, was detected, tried, and executed at Edinburgh, for the murder of numerous individuals. The vigilance with which the burying-grounds throughout the country were watched rendered a supply of subjects for anatomical schools almost altogether impracticable, and the demand for dead bodies consequently became great.' This led the above-mentioned individual, in conjunction with another wretch, named Hare, to murder, by strangulation, many human beings, whose bodies they sold to the proprietor of an Anatomical Theatre in Edinburgh; who, it was alleged, was unable to determine the method by which they had been obtained, although the public entertained suspicions of his guilty participation in the horrid traffic. A similar practice, though by a somewhat different method, was, within a few years afterwards, carried on in London, and from similar causes. Such atrocious practices must be looked upon with horror; and it ought to be the endeavour of every man to prevent their continuance. That the schools of anatomy ought to receive a moderate and regular supply of subjects can admit of little question, when it is considered that the preservation of the lives of thousands must rest upon the knowledge and dexterity of the young men trained there to the arts of dissection and surgical operation. A correct knowledge of medicine must ultimately rest on an intimate acquaintance with the structure of the human body; and the successful practice of surgery requires repeated and careful dissections; nor can these ever be obtained in any other way than by a constant application to the dead subject. Dr. Cheselden, who was perhaps the best anatomist of his time, was wont to say, 'He who would operate with success on the living, must be careful to practise frequently on the dead: even yet, having been twenty years in practice, when I know that I have to perform any operation in surgery, I take care on the previous evening to practise on the dead body.' It is useless to say that anatomy can be learned by the assistance of plates—they indeed may give a general idea of the structure of the human frame to a general reader, but to the practical man they can be of little avail. In 1832 a provision was made for supplying the anatomical theatres through-

out the kingdom from the unclaimed dead in the hospitals, which will unquestionably prevent the repetition of burking, at least for the same purpose as it was originally practised. In Paris the unclaimed subjects are brought in the morning from the hospitals to a large hall appropriated for dissection, which is open for public inspection. During the course of the day the students are employed in dissecting these bodies, and in the evening the hall is entirely cleared, and the bodies decently interred. Hence it is that the French surgeons are often celebrated, and murder or resurrection, both revolting to the nature of man, for the purposes of anatomy, are in Paris unknown.

BURLEIGH, LORD. See CECIL.

BURLESQUE signifies the low comic arising from a ludicrous mixture of things high and low. High thoughts, for instance, are clothed in low expressions, or noble subjects described in a familiar manner, or *vice versâ*. The burlesque style allows of the mixture of foreign and domestic words, the introduction of provincialisms, colloquial phrases, &c. Its object may be simply to excite laughter, or to provoke derision and ridicule.

BURLETTA, a light, comic species of musical drama, which derives its name from the Italian *burlare*, to jest. It originated in Italy, from whence it passed to the Transalpine countries.

BURLINGTON, a town in England. See BRIDLINGTON.

BURLINGTON, a city in Vermont, United States, and capital of Chittenden county, situated on a bay, to which it gives name, on the S. side of the entrance of Onion River into Lake Champlain, 100 miles S. of Montreal. Pop. in 1870, 14,387. Burlington is the most considerable commercial town in Vermont. Its trade is principally with the city of New York, with which it has a water communication by means of Lake Champlain, the Champlain Canal, and the river Hudson.—The University of Vermont was incorporated and established at Burlington in 1791, but it did not come into operation till 1800. It is finely situated on the E. side of the village, 1 mile distant from Lake Champlain, on ground elevated 245 feet above the surface of the water, and commands an extensive and delightful prospect, embracing a view of the lake, with the high mountains beyond on the W., and the Green Mountains on the E. A large college edifice of brick, which was completed in 1801, was consumed by fire in 1824; since which time three brick edifices have been erected, two of them containing rooms for students, the other containing a chapel and other public rooms. The university possesses considerable endowments, consisting chiefly of lands; but the number of students has never been large.

BURMAH. See BIRMAH (BRITISH), and BIRMAN EMPIRE.

BURMAN, the name of a family of learned men, originally from Cologne.—1. PIETER, born at Utrecht in 1668, studied there and at Leyden. He became Doctor of Law in 1688. After travelling in Germany and Switzerland, he began the practice of the law, without, however, deserting the study of the ancients, as is proved by his treatise De Vectigalibus Pop. Rom. In 1696 he was made professor of rhetoric and poetry at the University of Utrecht. At a later period he became professor of the Greek language and politics. From this time he published, annually, either some classic author, with notes, or masterly Latin verses, or some pamphlet against his adversaries, of whom he had made many by his intolerant vehemence. His editions of the classics are not so much distinguished for taste as for learning and accuracy. He became professor of eloquence, history, and the Greek language, in Leyden, 1715, and died in 1741. His younger brother, Franz, died in 1719, while professor of theology at Utrecht, and was the author of several theological writings. He left four sons, distinguished likewise as scholars.——2. JAN, born in 1706, died 1779, at Amsterdam, was a physician and professor of botany. Linnæus makes honourable mention of his writings.——3. PIETER, born in 1713, devoted himself, like his uncle, to philological pursuits. In 1734 he was made Doctor of Law at Utrecht. In the following year he became professor of eloquence and history at the University of Franeker. In 1742 he went to Amsterdam, as professor of history and ancient languages, where he became, in succession, professor of poetry, librarian, and inspector of the gymnasium. Like his uncle, he has published many good editions, particularly of the Latin classics; like him, he was distinguished by learning, by his talent for Latin poetry, and by his hasty disposition. He died in 1778.——4. NIKOLAAS LAURENS, born in 1734, succeeded in 1781 his father Jan as professor of botany, for which science he did much by his own writings, and by aiding the undertakings of others. In particular, he encouraged Thunberg to visit the Cape of Good Hope and Japan. He died in 1793.

BURMANN, GOTTLOB WILHELM (originally *Bormann*), born in 1737, at Lauban, in Upper Lusatia, resided in Berlin in great poverty. He was small of figure, meagre, lame, and deformed, but was endowed with sensibility for everything sublime and beautiful. He was highly eccentric. His poems were irregular and deficient in taste and finish. His merits were obscured by his singularities, and his vigorous talents were forgotten before he died. He had a rare talent of improvisation. His most celebrated works are his fables, songs, and his poems without the letter *r*. He died in 1805.

BURNES, SIR ALEXANDER, was born at Montrose in 1805, studied at the academy there, and having obtained a cadetship, arrived at Bombay in 1821. Here his proficiency in Hindustani and Persian procured him two appointments as interpreter, and contributed greatly to his future promotion. In 1827 he drew up an elaborate paper on the statistics of Wagur, and in 1828 a memoir on the E. mouth of the Indus, for both of which he received the thanks of the government, and in 1829 he was appointed to assist the political agent in Cutch in prosecuting the survey of the N.W. frontier. In 1830 he was appointed to proceed to Lahore, ostensibly for the purpose of delivering a present of horses from the King of England to Runjeet Singh, but really for the purpose of acquainting himself with the Indus, with the view of opening it up to commercial enterprise. On returning from this mission, which he successfully accomplished, he proposed a mission into Central Asia, and having obtained the sanction of the government, set out in January, 1832, descended the Sutlej to Lahore, proceeded thereafter to Peshawur, Cabul, and Bokhara. He afterwards travelled with a caravan across the desert of Merwe, visited the Shah of Persia in his capital of Teheran, travelled southwards to the Persian Gulf, and there embarking in a cruiser at Bussorah, reached Bombay after a year's absence. He was afterwards sent to England as the bearer of his own despatches, received the special thanks of the court of directors, published his travels, which were read with a kind of enthusiasm, and was presented with the gold medal of the Royal and the silver medal of the French Geographical Societies. After his return to India in 1835 he was employed on several important missions, and in 1839 was appointed political agent at Cabul. Here in 1841, on the breaking out of an insurrection, he was murdered along with his brother and several other Europeans.

An account of his journey to Cabul and residence in it has since been published.

BURNET, the popular name of two genera of plants, both of which belong to the natural order Sanguisorbaceæ of Lindley, which forms the sub-order Sanguisorbeæ, of the natural order Rosaceæ, with most other botanists.—1. COMMON or LESSER BURNET (*Poterium sanguisorba*), a perennial plant which grows to the height of about 2 feet; leaves smooth, alternate, imparipinnate, composed of serrate leaflets; flowers arranged in rounded heads of a purplish colour, with the female flowers above and the male flowers below. It is found in sunny places in the middle and s. of Europe, and also in England, especially in the chalk districts. It is cultivated in kitchen gardens for its aromatic leaves, which are used to season salads. It is also an excellent food for cattle.——2. GREATER BURNET (*Sanguisorba officinalis*), also a perennial plant with imparipinnate leaves; calyx in four divisions; corolla wanting; stamens, four. Its stem is straight, from 2 to 3 feet in height; leaflets ovate, smooth; flowers red, arranged on oval spikes at the extremity of long peduncles. This plant grows chiefly in dry meadows, and is found in some parts of England. Its habits are the same as those of the lesser burnet, but its perfume is less agreeable, and it is less astringent. It forms a very wholesome food for cattle, although its hard stalks sometimes cause them to refuse it.

BURNET, GILBERT, a celebrated prelate and historian, was born at Edinburgh in 1643, and, having studied at Aberdeen, he travelled into Holland in 1664. On his return he was made fellow of the Royal Society in London, and ordained at Edinburgh in 1665. In 1669 he was made professor of divinity at Glasgow, where he published his Conference between a Conformist and a Nonconformist; also, Memoirs of the Duke of Hamilton; and was offered a Scottish bishopric, which he refused. His Vindication of the Church and State of Scotland, in which he maintains the cause of Episcopacy, was much approved of at court, and a bishopric was again offered him, and refused. In 1673 he was made chaplain in ordinary to the king, and was in high credit both with Charles and the Duke of York. In consequence of the machinations in favour of Popery, he inclined to the opposition party in the Scottish Parliament, and afterwards removed to London, where he was coldly received by the king, and struck out of his list of court chaplains. The nation being alarmed on account of the progress of Popery, Burnet undertook a History of the Reformation in England. He gave a first volume to the public in 1679, when the affair of the Popish Plot was in agitation. It procured for the author the unprecedented honour of thanks from both houses of Parliament. The second volume appeared in 1681; the third, which was supplementary, in 1714. This is esteemed the most valuable of his writings. The high character of Burnet as a divine caused him to be sent for by the witty and profligate Earl of Rochester, when, exhausted by a course of libertinism, he was sinking into the grave, at the early age of thirty-three. The result of his conferences with the dying nobleman he gave to the world in his celebrated Account of the Life and Death of the Earl of Rochester. About this time he wrote a letter to the king censuring his public misgovernment and private vices. His connection with the opposition party was now very intimate, and he attended Lord Russell to the scaffold, whose speech there it is thought that he penned. He published, during this period, several works in favour of liberty and Protestantism, and wrote the lives of Bishop Bedell and Sir Matthew Hale. On the accession of James II. he made a tour in France and Italy, of which he published an account in letters addressed to Mr. Boyle. At the close of his travels he was invited to the Hague by the Prince and Princess of Orange, and had a great share in the councils relative to Britain. James caused a prosecution for high treason to be commenced against him in England, and demanded his person from the States, who refused to deliver him up. In the Revolution he took an active part, accompanying the Prince of Orange to England as chaplain, and was rewarded for his services with the bishopric of Sarum. On taking his seat in the House of Lords, he displayed his usual moderation in regard to the non-juring clergy and dissenters. As a prelate Bishop Burnet distinguished himself by fervour, assiduity, and charity. In 1699 he published his Exposition of the Thirty-nine Articles. The scheme for the augmentation of poor livings out of the first-fruits and tenths due to the crown originated with Burnet. He died in March, 1715, in the seventy-second year of his age, leaving behind him his well-known History of his Own Times, with an Account of his Life (two vols. fol. 1723–24).

BURNET, THOMAS, a learned divine and philosopher, was born at Croft, in Yorkshire, about 1635, educated under Dr. Ralph Cudworth, at Cambridge, and afterwards travelled as tutor to several young noblemen. In 1681 he made himself known by his Telluria sacra Theoria, which he subsequently translated into English. After the Revolution of 1688 Burnet was appointed chaplain in ordinary and clerk of the closet to King William. In 1692 he published his Archæologia Philosophica, sive Doctrina antiqua de Rerum Originibus. The freedom of opinion displayed in this work led to the removal of the author from the clerkship of the royal closet. He died in September, 1715, and was interred in the Charterhouse Chapel. Two posthumous works of this author appeared in 1727—a Treatise De Fide et Officiis Christianorum; and another, De Statu Mortuorum et Resurgentium. All the works of Burnet exhibit him as an ingenious speculator, rather than as a patient and sober inquirer concerning the moral and natural phenomena of which he treats. His great work, the Theory of the Earth, is one of the many systems of cosmogony in which Christian philosophers have attempted to reconcile the Mosaic account of the creation, paradise, and the deluge, with the traditions of the ancients and the principles of modern science. His speculations are recommended by sublimity of description and eloquence of style. In his Archæologia Philosophica, the doctor has combated the literal interpretation of the history of the fall of man; and to expose its improbability he has introduced an imaginary dialogue between Eve and the serpent, which, as coming from the pen of a divine, is singular enough. It is only to be found in the first edition of the work.

BURNETT, JAMES, better known by his official title of Lord Monboddo, as judge of the Court of Session in Scotland. He was born in 1714, at the family seat of Monboddo, in Kincardineshire. After studying at Aberdeen he went to the University of Groningen, whence he returned in 1738, and commenced practice as an advocate at the Scottish bar. In 1767 he was raised to the bench on the decease of his relative, Lord Miltown. He distinguished himself by his writings as a metaphysician, having published a Dissertation on the Origin and Progress of Language (1771–76, three vols. 4to), and Ancient Metaphysics (1778, &c., three vols. 4to). Lord Monboddo was an enthusiastic admirer of ancient literature, and especially of the works of Plato, and other Grecian philosophers. His works contain many interesting observations, but also exhibit some strange

and paradoxical opinions. Thus he seriously advocates the existence of satyrs and mermaids, and has advanced some whimsical speculations relative to a supposed affinity between the human race and the monkey tribe, which exposed him to a good deal of ridicule on the first publication of his theories. Both his official and his private character were extremely respectable; and he was, notwithstanding his eccentricities, a man of learning and ability. He died, in consequence of a paralytic stroke, at Edinburgh, May 26, 1799.

BURNEY, CHARLES, an eminent composer and writer on music, was born at Shrewsbury in 1726, and began his studies at Chester, under the organist of the cathedral there, continued them at Shrewsbury, under the direction of his half-brother Burney, and completed them in London between 1744 and 1747, under Dr. Arne. In the latter year appeared his first compositions. His musical pieces, Alfred and Queen Mab, composed in 1749, made him known. In 1751 he obtained the place of organist at Lynn Regis, in Norfolk. Here he commenced his General History of Music, and determined to visit all the institutions in Europe at which he could obtain important information for his work. In 1760 he returned to London, at the request of the Duke of York, where his compositions, and the musical skill of his eldest daughter, then eight years of age, excited admiration. In 1769 the University of Oxford bestowed on him the honorary degree of Doctor of Music. In 1770 he visited France and Italy, and, two years afterwards, the Netherlands and Germany, for the sake of his great work. He published an account of both tours. After his second return he became a fellow of the Royal Society. In 1776 appeared the first volume of his General History of Music from the earliest ages to the present period (4to); the second in 1779; and the third and fourth in 1789. He is the author also of several other valuable works, among which are the Memoir of Handel, and several musical compositions. He died in April, 1814, in the office of organist at Chelsea College. He wrote most of the musical articles in Rees' Cyclopedia. Burney had a numerous family, several members of which have highly distinguished themselves. His second daughter, Francisca (afterwards Madame d'Arblay), authoress of the well-known novels Evelina, Cecilia, and Camilla, and also of a well-known Diary, published a memoir of her father.

BURNEY, CHARLES, second son of the historian of music, a classical scholar and critic of high reputation. He was born at Lynn, in Norfolk, in 1757, and received his education at the Charterhouse School, and the Universities of Cambridge and Aberdeen; distinguished himself as a writer in the Monthly Review, to which he contributed many articles on classical literature; subsequently entered into holy orders, and obtained some preferment in the church. He died in December, 1817, and his valuable collection of books, many of them enriched with manuscript notes, was purchased by Parliament for the British Museum. Burney published an Appendix to Scapula's Greek Lexicon from the MSS. of Dr. Askew; a valuable edition of the Choral Odes of Æschylus, the Greek tragedian; the Greek Lexicon of Philemon; Remarks on the Greek Verses of Milton; an Abridgment of Pearson's Exposition of the Creed; and a sermon preached at St. Paul's: besides which he printed, for private distribution, a small impression of the Latin epistles of Dr. Bentley and other learned scholars.

BURNING-GLASS, a lens which unites the rays of light that fall upon it in so narrow a space as to cause them to kindle any combustible matter coming in their way, like fire. The same name has been sometimes given, though improperly, to the burning-mirror. The lenses commonly used as burning-glasses are convex on both sides; these bring the rays upon a point with the greatest force, because of the shortness of their focal distance. The effects of a burning-glass are more powerful in proportion as its surface is greater, and its focus smaller. That such a glass may produce its greatest effect, it is necessary that the rays of the sun should fall upon it in a perpendicular direction, which is the case when the image of the sun, that appears at the moment of burning, is circular. If a second lens, of a smaller focal distance, is placed between the first and its focus, so as to intercept the rays which pass through the first, they are still more condensed, and united in a still narrower compass, so that the effect is greatly augmented. The Greeks and Romans seem to have been acquainted with burning-glasses, or at least with a kind of transparent stones similar to them. They became more known in the thirteenth century. At the close of the seventeenth, Von Tschirnhausen caused immense burning-glasses, consisting of one piece, to be polished with incredible pains. Two of them, still in Paris, are 33 inches in diameter, and the weight of one amounts to 160 pounds. Both glasses produce an effect equal to that of the most intense fire. They kindle wood which is both hard and wet in a moment, and make cold water, in small vessels, boil in an instant; metals, placed upon a plate of china, are melted and vitrified by them; tiles, slates, and similar objects, become instantly red-hot and vitrified. But these have been surpassed by one made of flint-glass by Mr. Parker of London. It has a diameter of 3 feet, a focal distance of 6 feet 8 inches, is 3¼ inches thick at the centre, and weighs 212 lbs. The effects of this lens are still more extraordinary than those of Tschirnhausen's glasses. A much cheaper method of making burning-glasses was adopted by Brisson and Lavoisier in 1774, who put together two lenses, resembling those used for watch glasses, filling up the space between them with a transparent fluid. In this manner veins and impurities may be more effectually avoided. They succeeded in making a burning-glass of 4 feet in diameter, the greatest thickness of which, in the centre, amounted to 8 inches, and which, of itself, had a much greater power than the glasses of Tschirnhausen in connection with a smaller lens or collective glass; but produced an extraordinary effect if joined to a collective glass.

The experiments made by means of large burning-glasses are important in chemistry and physics. The power of a burning-glass, however, is almost four times less than that of a burning mirror, or reflector (which see) of equal extent and equal curvature. This reflects more heat than the glass allows to pass through it; has a smaller focal distance, and is free from the dissipation of the rays which takes place in the burning-glass, since it reflects them all nearly to one point, while the burning-glass refracts them to different points. On the other hand, the burning-glass is much more convenient, on account of the place of its focus, which is behind the glass. The burning point (focus) is an image of the sun; its diameter is equal to the 108th part of the focal distance, and its centre is the *focus* properly so called. In the higher branches of geometry and conic sections the *foci* are points in the parabola, ellipsis, and hyperbola, where the rays reflected from all parts of these curves meet. Several accidents in modern times have shown that conflagrations may be caused by convex window-glasses or water-bottles, &c., which have the form of burning-glasses, if the rays of the sun are concentrated by them upon combustible substances lying within their reach. Since the casting and polishing of large

lenses are attended with great difficulties, Buffon's plan of casting them in pieces or zones, and afterwards putting them together, is commonly practised. Lenses of this last kind are now generally applied for augmenting the light on lighthouses, according to arrangements introduced by Fresnel, Thomas Stevenson, &c. (See LIGHTHOUSES.) For the history of burning instruments, see the article BURNING MIRRORS.

BURNING MIRRORS, or REFLECTORS, mirrors, the smoothly polished surface of which reflects the rays of the sun that fall upon it in such a direction that they unite at some distance from the mirror, in a more limited space, and act upon substances within this space like the most powerful fire. Concave mirrors cause the rays that fall upon them in a direction parallel to their axes to converge. Spherical mirrors of this kind are the most common, but parabolic ones are also used; and even plane mirrors may be employed like concave ones, if several of them are combined in a proper manner. In order that a burning mirror should produce its whole effect, its axis must be directed exactly towards the centre of the sun's disk. This is the case if the light, intercepted, by a plane, perpendicular to the axis of the mirror, at its focal distance, forms a circle. The focus then lies in a straight line between the sun and the mirror. The ancients were acquainted with such mirrors, as is manifest from several of their writings still extant. It is impossible, from the nature of things, that Archimedes, during the siege of Syracuse by Marcellus, should have set on fire the fleet of the latter by means of concave mirrors: it would be more credible that it had been effected by a combination of plane mirrors. Various experiments have shown that great effects may be produced at a considerable distance by the latter instrument. Kircher placed five plane mirrors of an equal size in such a position as to reflect the rays upon a spot 100 feet distant, and thereby produce a great heat. Buffon in 1747 effected a combination of 168 plane mirrors, each of which was 6 inches broad and 8 long. With forty of these mirrors he set on fire, almost instantaneously, a board of beech wood covered with tar, at the distance of 66 feet; and with 128 mirrors, a board of pine wood, likewise covered with tar, at a distance of 150 feet. With forty-five mirrors he melted a tin bottle, at a distance of 20 feet, and with 117 mirrors, small pieces of money. He afterwards burned wood with this machine at the distance of 200 feet, melted tin at the distance of 150, lead at the distance of 130, and silver at the distance of 60 feet. During the last century several large mirrors were made in Italy, two of which are still in Paris and Cassel. Von Tschirnhausen also manufactured a large one in 1687, which is now in the mathematical hall in Dresden. This mirror sets wood on fire, makes water boil, melts tin 3 inches thick, as well as lead, vitrifies bricks, stones, &c. Besides metals, wood, pasteboard, and other materials serve for burning mirrors, if their surface be polished. Burning mirrors have often been used as reflectors (which see), to throw light at a great distance, and are employed with great advantage in lighthouses. If, for instance, a lamp is placed in the focus of a parabolic mirror, the rays of light which fall on it are all reflected in a direction parallel to the axis; thus the reflectors of Lenoir appear like stars of the first magnitude at the distance of 80,000 feet. For further information on burning-glasses and burning-mirrors, see Priestley's History and Present State of Optics; Buffon's Supplement to his Natural History; and the article Burning-Glasses in the Encyclopedia Britannica.

BURNISHER is a blunt, smooth tool, used for smoothing and polishing a rough surface by pressure, and not by removing any part of the body. Other processes of polishing detach the little asperities. Agates, tempered steel, and dogs' teeth are used for burnishing. It is one of the most expeditious methods of polishing, and one which gives the highest lustre. The burnishers used by engravers are formed to burnish with one end, and to erase blemishes with the other.

BURNLEY, a town, England, Lancashire, 21 miles N. of Manchester. It occupies a tongue of land at the confluence of the Burn and Calder, and consists of six principal streets, two of which are handsome and lined with excellent shops. Among the objects of interest are an old Saxon cross, and an ancient but modernized church, with a massive tower and chime of bells. There are National schools in a flourishing condition, a free grammar-school which has existed since the Reformation, &c. The staple manufacture is cotton goods, and there are large cotton, worsted, and corn mills, a printfield, and several extensive foundries and machine shops. Means of communication are amply supplied by the Leeds and Liverpool Canal, and by the East Lancashire and a branch of the Lancashire and Yorkshire Railways. A large and handsome market hall was opened on Jan. 1, 1870. Burnley was made a parliamentary burgh with one member by the Reform Bill of 1867. Pop. in 1871, within municipal boundary, 40,858; within parliamentary boundary, 44,320.

BURNOOSE (Arab, *al burnus*), a large kind of mantle in use among the Bedawin Arabs and the Berbers of Northern Africa, commonly made of white wool, but sometimes also of red, blue, green, or some other colour, and having a hood which may be drawn over the head in case of rain. In Spain also a similar garment is worn which bears the name of albornoz, and the name has also been applied to different kinds of upper garments worn by ladies of other European countries. It is now given to a kind of plaid, for the most part of brilliant colours, which is worn over one shoulder, where it is usually fastened by a brooch.

BURNOUF, EUGÈNE, born at Paris in 1801; died May 28, 1852. He commenced his studies at the College of Louis-le-Grand, became a pupil in the École des Chartes in 1822, passed as a lawyer in 1824, and soon after devoted himself to the study of oriental languages. In 1826 he attracted the attention of men of learning throughout Europe by publishing, in conjunction with his friend Chr. Lassen, an Essay on the Pali, or the sacred language of the Buddhists in Ceylon and the Eastern Peninsula, and in 1827 by furnishing an explanatory text to the series of lithographic plates prepared by Geringer and Chabrelle to illustrate the religion, manners, customs, &c., of the Hindu nations inhabiting the French possessions in India. This work was not completed till 1835. In 1832 he was admitted into the Academy of Inscriptions, and in the same year was appointed to the professorship of Sanskrit in the Collége de France, an office which he held till his death. His fame is chiefly due to his having, so to speak, restored to life an entire language, the Zend or old Persian language in which the Zoroastrian writings were composed. Anquetil-Duperron had obtained the text of the extant works of this sacred language of the Persians. It is the glory of Burnouf to have interpreted those works with the aid of the Sanskrit. To this part of his labours belong his Extrait d'un Commentaire et d'une Traduction nouvelle du Vendidad-Sadé (Paris, 1829); Observations sur la Grammaire de M. Bopp (Paris, 1833); Commentaire sur le Yaçna (Paris, 1833-35). Burnouf also distinguished himself by his labours on Buddhism. On this subject he published the text accompanied by a transla-

tion of the Bhâgavata Purâna (Paris, 1840–47); Introduction à l'Histoire du Bouddhisme Indien (Paris, 1st vol. 1844), &c. Burnouf, exhausted by his labours, was almost dying, when the Academy of Inscriptions, in token of respect for his devotion to literature, elected him secretary for life. But he was unable to fulfil the duties of the office, and died fifteen days afterwards.

BURNS, ROBERT, a very distinguished Scottish poet, was the son of William Burness or Burns, a gardener and small farmer near the town of Ayr, and was born January 25, 1759. He was brought up to rustic labour; but his education was not neglected, as he was, at an early age, instructed in English grammar by Mr. Murdoch (who died in 1824 in London), to which he added an acquaintance with the French language and practical mathematics. Smitten with a passion for reading, he devoted every moment he could spare to the perusal of such books as fell in his way, and among them, meeting with the works of some of the best English poets, he was enabled to cultivate and improve a taste for poetry and romantic fiction; which was, perhaps, first inspired by the chimney-corner tales of an old woman in his father's family, whose memory was plentifully stored with adventures of fairies, witches, warlocks, ghosts, and goblins, which she religiously believed, and therefore detailed with the most impressive effect to her admiring auditors. Burns' first poetical effusions were prompted by love, a passion of which he was peculiarly susceptible. Having begun he continued to make verses which attracted the notice of his neighbours, and gained him considerable reputation. In 1781 he engaged in business as a flax-dresser, in the town of Irvine; but his premises were destroyed by fire, and he was obliged to relinquish the undertaking. His father dying, he took a small farm in conjunction with a younger brother, and this scheme also proved unsuccessful. In the meantime he had formed a connection with a young woman, whom, on her becoming pregnant, he would have married, but his ruined circumstances induced her friends to object to it. Thus unsuccessful at home, he engaged himself as assistant overseer to a plantation in Jamaica. To obtain the funds necessary for the voyage he was induced to publish, by subscription, a volume of his poetical effusions. It was accordingly printed at Kilmarnock, in 1786, and Burns, having derived from the publication the assistance he expected, was about to set sail from his native land, when his purpose was prevented by the communication of a letter from Dr. Blacklock to a friend of the Ayrshire poet, recommending that he should visit Edinburgh, in order to take advantage of the general admiration his poems had excited, and publish a new edition of them. This advice was eagerly adopted, and the result exceeded his most sanguine expectations. After remaining more than a year in the Scottish metropolis, admired, flattered, and caressed by persons of eminence for their rank, fortune, or talents, he retired to the country with the sum of £500, which he had realized by the second publication of his poems. A part of this sum he advanced to his brother, and with the remainder took a considerable farm (Ellisland) near Dumfries, and he subsequently procured the office of an exciseman. He also now married Jean Armour, the young woman to whom he had previously been contracted. His convivial habits ere long prevented him from paying a proper attention to his farm; and after a trial of three years and a half he found himself obliged to resign his lease; and remove to the town of Dumfries, to follow his employment as an exciseman. He continued to exercise his pen, particularly in the composition of a number of beautiful songs, adapted to old Scottish tunes, for a periodical work published at Edinburgh. But his residence in Dumfries was by no means favourable to his habits. His society was courted by the idle, the gay, and the dissipated, who were delighted with his conversation, or charmed with his brilliant wit; and, perhaps, many who had little sympathy with the powers of his genius, were eager to solicit his acquaintance and society, that they might be able to boast of an intimacy with so extraordinary a man. In the winter of 1795 his constitution, broken by cares, irregularities, and passions, fell into premature decline. The summer returned, but only to shine on his sickness and his grave. In July, 1796, a rheumatic fever terminated his life and sufferings, at the early age of thirty-seven. He left a wife and four children, for whose support his friends and admirers raised a subscription; and with the same object an edition of his works, in four vols. 8vo, was published in 1800 by Dr. Currie of Liverpool. Numerous editions have appeared since. The chief biography of Burns is that by Lockhart (Life of Burns, Edin. 1828). His works have been several times translated into German.

In his person, Burns was about 5 feet 10 inches high, of a form that indicated strength as well as agility; his forehead was finely raised; his eyes were dark, large, full of ardour and intelligence. His character, though marred by imprudence, was never contaminated by duplicity or meanness. He was an honest, proud, warm-hearted man, combining sound understanding with high passions and a vigorous and excursive imagination. He was alive to every species of emotion; and he is one of the few poets who have at once excelled in humour, in tenderness, and in sublimity. His songs, his tales, and his poetical epistles display pathos, wit, a vigour of sentiment, and a purity and elegance of style which, in spite of their being clothed in what may be termed a provincial dialect, not only insure a permanent fame to their author, but advance him high in the records of native genius. His prose compositions, which consist entirely of private letters, never intended for the press, are altogether as extraordinary productions as his poems; and those literary men who were acquainted with him have asserted, that his conversation was not less calculated to leave a powerful impression of the extent and accuracy of his knowledge and observation, and the strength and vivacity of his genius.

BURNTISLAND, a small seaport in Scotland, Fife, on the N. shore of the estuary of the Forth, 7½ miles N. by W. Edinburgh. Some of the older houses in the main street are in the Flemish style, with their gables to the front; but many of the more modern are handsome and commodious buildings; and the town is every year improving as sea-bathing quarters, and is lighted with gas. It has four churches, a town-hall, several schools, including burgh school, two or three benevolent societies, a reading-room, and scientific lecture association. The fisheries are considerable; ship-building and distillation are carried on, the latter to a great extent. The harbour is capacious, of great depth, and of easy access. Coal and iron are imported. Burntisland is the steamboat ferry station on the passage of the North British Railway. It unites with Kinghorn, Dysart, and Kirkcaldy in sending a member to the House of Commons. Pop. in 1871, 3266.

BURROUGH, STEPHEN, an early English navigator who was employed to search for a N.E. passage to the Indies. He set out in 1556, and after doubling the North Cape sailed along the N. coast of Russia, touched at Nóva Zembla and the Isle of Waigatz, and reached 70½° N. lat. He then continued his course eastward, to search for the mouth of the Obi,

which was the special object of his voyage, but soon encountered such violent winds and masses of ice that he was constrained to retrace his steps to Kolmogori (White Russia), where he meant to pass the winter and resume his search in the ensuing spring. He received orders, however, to go in quest of some vessels which were missing, and then returned to England. The account of his voyage, contained in Hakluyt's Collection, proves him to have been an active and intelligent sailor. He is the first navigator from Western Europe who advanced so far to the N.E. and saw the Samoyeds. His observations are numerous and exact, but he has committed some glaring errors in regard to latitude.

BURSARY, an endowment in one of the Scotch universities, corresponding to an exhibition in an English university, and intended for the support of a student during his ordinary course, and accordingly before he has taken a degree in the faculty in which he holds the bursary. This circumstance, according to the usage prevailing in Scotland, distinguishes bursaries from scholarships and fellowships, both of which are bestowed after one has taken a degree. This distinction, however, is not rigidly adhered to, for there are one or two bursaries, especially in the faculty of divinity, which are commonly called scholarships, but the tendency in Scotland is to limit the application of the words in the manner indicated. Each of the four universities of Scotland has a greater or smaller number of bursaries. As yet the University of Aberdeen is better provided than any of the others with this class of endowments. Bursaries are in the gift sometimes of the Senatus Academicus of the university to which they belong, sometimes of the town-council of the city in which the university is situated, and sometimes of private individuals. With regard to the manner in which they are bestowed, some are obtained after competitive examination, and others are given by the patrons for special reasons. As the former method of bestowing them is found to be the more beneficial in its results, it is gradually becoming the prevailing one, and at Aberdeen it has always been the prevailing one. Bursaries which are in the gift of the Senatus Academicus are all bestowed in this way. The word 'bursary' is derived from the late Latin (originally Greek) *bursa*, which properly signified a 'pocket' or 'purse,' from which came the word 'bursarius' (bursar), which was employed to designate the treasurer of a monastery. After the foundation of the University of Paris the word 'bursa' came to be applied there to certain buildings connected with the university, in which the poorer students received support and instruction free, as well as to a free place in these buildings. From France the word passed, in a slightly different form and with a somewhat different signification, to Scotland.

BURSCHEN, the name given to one another by the students at the German universities. It is derived from *bursales*, or *bursarii*, the name which the students bore in the middle ages, from the buildings (*bursæ*) in which they lived in common. See UNIVERSITIES.

BURSLEM, a town and parish, England, county of Stafford. The town stands on a slope, on the North Staffordshire Railway, 17 miles N. of Stafford; has four principal streets and a spacious market-place, all clean and lighted with gas; houses of brick, and generally well built; water abundant. It has three Established churches, fourteen Dissenting chapels, numerous schools, a mechanics' institute, and extensive manufactures of china and earthenware. Pop. in 1871, 25,562.

BURTON, ROBERT, a writer of the seventeenth century. He was born at Lindley, in Leicestershire, in 1576, educated at Oxford, embraced the ecclesiastical profession, and became rector of Seagrave, in Leicestershire. His learning, which was various and extensive, is copiously displayed in the Anatomy of Melancholy, by Democritus Junior, first published in 1621, and repeatedly reprinted. Burton died in 1640, and was buried at Christ Church, with the following epitaph, said to have been his own composition:—

'Paucis notus, paucioribus ignotus,
Hic jacet
Democritus Junior;
Cui vitam dedit et mortem
Melancholia.'

He was a man of integrity and benevolence, but subject to strange fits of hypochondriac melancholy, which rendered his conduct flighty and inconsistent. Sometimes he was an agreeable and lively companion, delighting those around him with perpetual sallies of wit and humour; while at other times, devoured with spleen and *ennui*, he sought relief by listening to the jests of the bargemen on the river near Oxford. He is reported also to have undertaken the composition of his Anatomy of Melancholy with a view to the dissipation of his morbid feelings. Among those who have been most deeply indebted to Burton is Sterne, the author of Tristram Shandy.

BURTON-UPON-TRENT, a town of England, in Staffordshire, on the N. bank of the Trent. Burton-upon-Trent is mentioned early in English history, and it suffered much in the civil wars. Malting and iron-founding are carried on to a considerable extent, but it is chiefly celebrated for its excellent ale, of which vast quantities are made, both for home consumption and exportation. There are twenty-six breweries at work, including those of Messrs. Bass and Allsopp, the former of which covers more than 40, the latter about 50 acres of ground. Contrary to common usage, the brewers in preparing it employ hard water obtained from wells, instead of soft water. The town possesses a grammar-school, three National schools, and a British school, four blocks of almshouses, a dispensary and infirmary, two public libraries and reading-rooms, and a workhouse. Pop. in 1861, 13,671; in 1871, 20,378.

BURTSCHEID, or BORCETTE, a town, Prussia, and properly a suburb of Aix-la-Chapelle, with which it is connected by an avenue of trees, being not half a mile distant from it. It contains a townhouse and three churches (two Roman Catholic and one Protestant), and carries on extensive manufactures, particularly of woollens and cassimeres. Its thermal springs, which rise in the hill immediately above the town, are celebrated. Pop. in 1871, 10,079.

BURY, a town, England, Lancashire, 6 miles E. of Bolton, with 37,563 inhabitants. It is well situated on a rising ground between the Irwell and the Roche, and consists of three principal streets and a commodious market-place. By the Reform Act of 1832 it was constituted a parliamentary borough, and returns one member to Parliament. The parish church has a beautiful tower and spire, and among other religious edifices is a chaste Gothic chapel, with elegant tower, belonging to the Roman Catholics. The staple manufacture is woollens, and there are also numerous cotton mills and factories, bleaching and printing works, dyeworks, foundries, and paper mills. The Liverpool, Wigan, Bolton, and Bury Railway, the East Lancashire, and a branch of the Manchester and Leeds Railways, furnish ample means of communication. The late Sir Robert Peel was born at Chamber Hall in the vicinity in 1788. A monument has been erected to his memory, which was unveiled in 1852.

BURYING-BEETLE (*Necrophorus*), the name of a genus of insects belonging to the order Coleoptera, and the tribe of the Silphales, or carrion beetles. Their body is angular; the antennæ are longer than the head, and terminated in the form of clubs with small conical knobs; the elytra or wing-cases are cut at the extremity at right angles. They are remarkable for the keenness of their scent, which enables them to discover in the course of their rapid flight, the bodies of rats, mice, moles, &c., recently dead. When they have discovered one several of them gather about it, and creeping under it, begin hollowing out the earth with their head, until the body gradually sinks to the depth of 6 inches or even a foot. They then cover it over with the earth they had dug out, and make the spot level. This labour requires not less than twenty-four hours. In the body which is thus buried the insects deposit their eggs, out of which, in less than a fortnight, the dirty-white larvæ creep, and regale themselves on the store of food which has been prepared for them. Before entering into the pupa state the larvæ go somewhat deeper into the earth, and thereupon the development takes place so rapidly that, under favourable circumstances, there may be three generations in a single year. The species are common everywhere. One of the best known is the *Necrophorus vespillo* of Linnæus, with red antennæ, and two bright orange bands across the back.

BURYING-PLACES. The custom of burying the dead in public places prevailed among the most ancient nations. The Romans had this custom in the earliest times. Afterwards, in the flourishing periods of the republic, they burned their dead and only buried the ashes, collected in urns (*urnæ*). The ancient Germans buried their dead in the groves consecrated by their priests. With the introduction of the Christian religion consecrated places were appropriated for the purpose of general burial; and it was regarded as ignominious not to be buried in consecrated earth. The deprivation of the rites of burial was, therefore, part of the punishment of excommunication. The Romans were accustomed to provide their sepulchres at least with a stone, upon which was inscribed the name of the deceased, and the wish, *Sit illi terra levis* (that is, May the earth rest lightly upon him). This custom was preserved by the Christians. The sepulchres in churches originated from an inclination, common to men of all times and nations, to honour their relations, even in the grave. The Egyptians, Greeks, and Romans erected over the graves of men of rank, or persons otherwise remarkable, pyramids, *mausolea*, or temples. After the introduction of Christianity little churches, called *chapels*, were erected over the dead. The early Christian martyrs were buried in caverns, which by degrees were enlarged to spacious subterranean vaults, and called *chambers of repose*. In the sequel, others considered themselves happy if their bones were allowed to repose near the ashes of a martyr. The sepulchres of the martyrs were, on this account, distinguished by a white altar over them. When the Christians were allowed the public exercise of their religion they erected churches, and the heathen temples became places of Christian worship. As early as the fourth century they built churches over the sepulchres of the holy martyrs; and in the belief that a place was sanctified by their ashes, they anxiously sought out, on the erection of new churches in cities, or the transformation of heathen temples into Christian churches, the remains (relics) of the martyrs, and buried them under the altar of the new church to communicate to it a character of greater sanctity. It gradually came to be universally considered among the Christians a privilege to be buried in the neighbourhood of a saint. The Emperor Constantine, who died in 337, was the first person that we know of who ordered his sepulchre to be erected in a church. This was done in the Church of the Apostles at Constantinople, of which he was the founder, and therefore probably considered himself as peculiarly entitled to this privilege. He was soon imitated by the bishops, and in the sequel all those who had enriched the church were distinguished by this honour. The Emperors Theodosius and Justinian, indeed, forbade the erection of sepulchres in churches, but in vain. Leo the Philosopher again permitted them to everybody. It is only in later times that men have become convinced how injurious it is to the health of the living to remain for a long time in the vicinity of the dead, particularly if the corpses remain standing in simple coffins, and are not placed deep in the earth, as is commonly the case in the sepulchral vaults of churches. From these the effluvia of putrefaction escape easily, and diffuse themselves in the air. On the occasion of opening such sepulchral vaults, those who stood near them have sometimes fallen dead on the spot, and no one could venture into the church for a long time after without exposing himself to dangerous consequences. At present the burying in churches is almost everywhere suppressed, or at least permitted only under certain restrictions. Even in Naples and Rome the general practice of erecting sepulchres in churches was forbidden in 1809, and the foundation of burial-places without the city was provided for. The custom introduced by the communities of Moravian Brothers, who form their burial-places into gardens, is now becoming general; and cemeteries, instead of exhibiting merely dull ranges of tombstones, are adorned with flower-plots and ornamental shrubbery. The celebrated burying-place of *Père la Chaise*, near Paris, is one of the most beautiful and interesting spots in the world.

BURY ST. EDMUND'S, a town in Suffolk, England, well built and delightfully situated on the Larke, 26 miles from Ipswich. It contains four churches, two of them being fine old Gothic edifices. There are places of worship belonging to the Independents, Methodists, Baptists, and others; a handsome corn exchange, built in 1862; the athenæum, containing library and museum, &c. There are no manufactures, but there is a large trade in agricultural produce. Of many benevolent institutions the principal is a free school founded by Edward VI. Bury St. Edmund's is a borough, returning two representatives. It is an ancient place, and is supposed to have derived its name from St. Edmund, a king of the East Angles, who was buried here. The barons in John's reign met here, and formed a league against him. Bury St. Edmund's has been the seat of two Parliaments, and contains the remains of an abbey, the most wealthy and magnificent in Britain, 'with gates of brass, towers, and high walls, so that one might think the monastery alone a city.' Pop. in 1871, 14,928.

BUSACO, a convent in Portugal, in the province of Beira, occupied by Carmelite monks. The prospect from the summit of the Sierra de Busaco is one of the finest in Portugal. It is memorable for the battle, September 27, 1810, between Massena and Wellington, who, on a retreat before the superior forces of the former, availed himself of the favourable position of the Sierra for checking the pursuit. Two attacks, one on the right wing, consisting of British, and the other on the left, composed chiefly of Portuguese, were repulsed; but Massena having detached a force to march round the mountain and cut off the British troops from Coimbra, Wellington retreated towards that city, and afterwards to the lines of Torres Vedras.

BUSBECQ, or BUSBEQUIUS, AUGIER GHISLEN, the natural son of a nobleman; born in 1522 at Comines in Flanders; legitimated by Charles V. After having studied in the most celebrated universities of Flanders, France, and Italy, he accompanied Peter Lassa, ambassador of Ferdinand, king of the Romans, to England. In the next year (1555) that prince made him his ambassador to Soliman II. His first negotiation was not very successful. He obtained only an armistice for six months, and a letter, which he delivered immediately to Ferdinand. He then returned to his post, and this time his negotiations were completely successful. After seven years he returned home, and was made tutor of the sons of Maximilian II. When this prince became emperor Busbecq was sent to accompany the Archduchess Elizabeth (who was to be married to Charles IX.) on her journey to France. Busbecq remained there in the character of steward with Elizabeth, and when she left France, after the death of her husband, he continued there as ambassador of Rodolph II. In 1592 he set out on his return to Flanders, and was attacked on the way by a party of the Leaguers. As soon as they had seen his passports they permitted him to continue his journey unmolested from respect to his character of an ambassador; but the terror which he had suffered threw him into a violent fever, of which he died several days afterwards. We have remaining two important works of his: 1. Legationis Turcicæ Epistolæ quatuor, in which the policy, the power, and the weakness of the Porte are so profoundly and clearly explained, that even at present information may be drawn from them; and 2. Epistolæ ad Rudolphum II., Imp. e Gallia scriptæ (editæ a Houwaert), a very important work for the history of those times. His style is pure, elegant, and simple. During his stay in Turkey he collected Greek inscriptions, which he communicated to Andreas Schott, Justus Lipsius, and Gruter. We are indebted to him for a copy of the celebrated Monumentum Ancyranum, which he had transcribed and brought to Europe. More than a hundred Greek manuscripts, which he had collected, were presented by him to the library of Vienna.

BÜSCHING, ANTON FRIEDRICH, a distinguished geographer, was born, 1724, in Stadthagen, in Schaumburg-Lippe; and studied theology in Halle in 1744, where he found a friend and protector in Baumgarten. On his travels as tutor of the young Count of Lynar, he became convinced of the defects of existing geographical treatises, and resolved to write a new one, which he began on his return to Germany (1752), by publishing a short Description of Schleswig and Holstein as a specimen. In 1754 he was made professor of philosophy in Göttingen. In 1755 he married Christiana Diltey, a lady who was remarkable as a member of the Göttingen learned society. Notwithstanding some difficulties about his heterodox opinions, he received an invitation to become pastor in a Lutheran church at Petersburg. In 1766 he was made director of the united gymnasiums of Berlin and of the suburb Kölln, and discharged his duties with great diligence. He died in 1793. Before his great work, Allgemeine Erdbeschreibung, which he began to publish in 1754 in separate volumes, and which, though not entirely completed by the author, passed through eight legal editions during his life, neither the Germans nor any other nation had a thoroughly scientific geographical work.

BUSEMBAUM, HERMANN, a Jesuit, famous for his Medulla Theologiæ moralis, ex variis probatisque Auctoribus concinnata, born at Nottelen, in Westphalia, 1600, and died in 1668. His work was much used in the seminaries of the Jesuits, and had passed through fifty editions, when Father Lacroix published it, increased from a single duodecimo to two folios by his own commentaries and the additions of Father Collendall. It was published at Lyons in 1729, with further additions by Father Montausan. This edition was reprinted in 1758 at Cologne. It was now found to contain principles concerning homicide and regicide, which appeared the more reprehensible on account of the recent attempt on the life of Louis XV., by Damiens. The Parliament of Toulouse caused the work to be publicly burned, and summoned the superiors of the Jesuits to appear at their bar for trial. They disavowed the doctrines of the book, declared themselves ignorant of the author, and denied that any Jesuit had any share in it. The Parliament of Paris was satisfied with condemning the book. Against both these sentences Father Zaccaria, an Italian Jesuit, with the permission of his superiors, stepped forward as the defender of Busembaum and Lacroix; but his defence was condemned by the Parliament of Paris.

BUSHEL, an English dry measure, containing 8 gallons or 4 pecks. It is also used in the North American United States. The standard English bushel (12 Henry VII.) contains 8 gallons of wheat, each of 8 pounds troy, each of 12 ounces, each of 20 pennyweights, each of 32 corns of wheat that grew in the middle of the ear. In 1696, a duty being laid upon malt, it became necessary to ascertain the exact contents of the *Winchester bushel*, as that of Henry VII. was called. It was found that the capacity was 2151·7 cubic inches of pure water, equivalent to 1131 oz., 13 dwts. troy. The capacity of the *imperial bushel*, prescribed by the Act of Uniformity (5 Geo. IV.cap.lxxiv.),contains 2218·20 cubic inches, and holds 80 lbs. avoirdupois of pure water. This act (1826) provided for the use of a *heaped measure*, of 2815 cubic inches, for coal, potatoes, fruits, &c., such wares to be heaped up to a specified height above the rim of the measure. A subsequent law abolishes this, and confines the meting out of corn and all other dry produce to the *levelled* or *strike* measure.

BUSHIRE (properly, *Abu Shehr*, the father of cities), the principal seaport of Persia, prov. Fars, 118½ miles W.S.W. Shiraz, on a low sandy point running N.W., on the side of a bay on the N.E. coast of the Persian Gulf. The town lies on the edge of a desert, is of a triangular form, having the sea on two sides, and fortified, on the land side, by a high wall, nearly 1 mile in length, flanked at every 200 yards by a round tower, with loop-holes for musketry. It has seven mosques, a few hummums or baths, two caravansaries, and an Armenian church. A large palace, built by a late sheikh, stands about the centre of the town. The houses are flat-roofed, two stories high, and constructed chiefly of clay, or of a soft sandstone obtained from the ruins of Reshire, a decayed town 4 miles to the S. From a distance Bushire has rather an imposing appearance; but on a near approach the town is found to be a mean and dirty place. The bazaar is large and well supplied. Fruit, chiefly brought from Shiraz, may be obtained here all the year round. Bushire carries on a considerable traffic with India; its merchants, who are principally Armenians or Persians, supplying the greater part of Persia with Indian and European goods, for which silk and bullion are the principal returns. Among its exports are Cashmere and Persian shawls, dates, and dried fruits; tobacco, carpets, pearls, Shiraz wines, grain, and wool, with various drugs, dye-stuffs, and perfumes. An active trade is carried on with Shiraz by means of caravans. The anchorage is indifferent, but is the best on the coast. The pop. is stated at 10,000 or 11,000.

BUSHMEN, or BOSJESMEN, the common name of that wild race of people who call themselves Sáab

and who dwell in the western part of South Africa, in the immense plains bordering on the N. side of the colony of the Cape of Good Hope, and are lost in the unknown regions of the interior. They are a wild, rude, cruel, and miserable people. So far from forming a nation, they do not even form societies. They live together in single families, and unite in great numbers only for defence or for pillage. They do not cultivate the land, and have no domestic animals except the dog. Their usual food is locusts. They endure hunger for a long time, but indemnify themselves by their voracity if they are so fortunate as to kill any wild game, or steal an ox or a sheep. They are entirely destitute of huts and household furniture. The scorching heaven is their tent, and the hot sand their bed. Their weapons consist of a small bow and poisoned arrows, which they shoot, with astonishing accuracy, to a great distance. Their language is exceedingly poor. It consists of a certain rattling with the tongue, and harsh, gurgling tones, for which we have no letters. They are, for the most part, of low stature; their skin is of a dark yellow; and their hair, which resembles wool, is twisted together in small tufts. See HOTTENTOTS.

BUSHWANAS, or BOSHUANAS. See BECHUANAS.

BUSKIN (in Greek and Latin, *cothurnus*), a kind of high shoe worn upon the stage by the ancient actors of tragedy, in order to give them a more heroic appearance. It was introduced by Æschylus, and from this use the word is figuratively employed by the classic authors for tragedy itself (Juvenal, xv. 29), or for a lofty and elevated style (*grande munus Cecropio cothurno*, Hor. Od. ii. 1, 12). The buskin was also worn by both sexes, particularly by the ladies, for ornament (Juv. vi. 505). The Melpomene in the Villa Borghese has the buskin. Hunters and soldiers used a different kind, resembling the half boot.

BUSSORAH. See BASSORA.

BUSSY D'AMBOISE, LOUIS DE CLERMONT DE, born about the middle of the sixteenth century, acquired an infamous notoriety by the prominent part he took in the massacres of St. Bartholomew. Among others, he slew his own relation, Antoine de Clermont, thinking thereby to rid himself of a lawsuit which he had with him for the marquisate of Renel. He afterwards attached himself to the Duke of Anjou, and obtaining the command of the castle of Anjou, made himself universally odious by his pride and oppression. He had the meanness to become a pander to the low passions of the Duke, and undertook to seduce the wife of the Count of Montsoreau. The intrigue cost him his life. Montsoreau having come to the knowledge of it, obliged his wife to write Bussy, giving him a rendezvous at the castle of Constancières. Bussy arrived with a single confidant, and was immediately met by the count and several men in armour. In the struggle which ensued he lost his life, Aug. 19, 1579. According to De Thou, the whole province was overjoyed at his death; and even the Duke of Anjou, whose worthless minion he was, was not dissatisfied at having got quit of him.

BUSSY-RABUTIN, or ROGER DE RABUTIN, COMTE DE BUSSY, born at Epiry, in Nivernois, in 1618, entered the army at the age of twelve, and made several campaigns, during which he distinguished himself more by his rhymes and literary squibs, than by his merit as a soldier. Turenne, in a letter to the king, describes him as the best officer in his army, as far as songs were concerned. He acquired considerable notoriety by the publication of a scandalous chronicle entitled Histoire Amoureuse des Gaules. It cost him the loss of his official appointment and a year's imprisonment in the Bastile. He is also known as a correspondent of Madame de Sévigné, and is often mentioned in her celebrated letters. He had the vanity to suppose that he excelled her in her peculiar art, and his letters were afterwards published, in seven volumes, by his friend the Jesuit Bonhours. They are now almost forgotten. His only excellence as a writer is the purity of his style; but the Jesuits are said to have so far overrated his talent, that they had seriously proposed to employ him in writing an answer to Pascal's Provincial Letters. He died in 1693.

BUST (Italian, *il busto*, from the Latin *bustum*), in sculpture, the representation of that portion of the human figure which comprises the head and the upper part of the body. Busts are of different extent:—(1) such as consist of the head, the upper part of the neck, and the upper part of the shoulders; (2) heads with the upper part of the chest, to the end of the breast-bone (*busts* properly so called); and (3) heads with the whole chest to the middle of the body, often to the hips. Between the bust and its pedestal is sometimes a column, or a square prop; such busts are called Hermæ, so called because in ancient Greece such columns were commonly surmounted by a head of Hermes. From these Hermæ it is probable that the proper bust gradually arose, although it can neither be shown that busts existed in the early period of Greek art, nor had either the Greeks or Romans a special name for this kind of figure. The bust does not seem to have become common among the Greeks till the time of Alexander, nor among the Romans till the time of the empire. On the other hand, during the period when archæological studies flourished among the Greeks, the portrait busts of the learned formed an important branch of art, since there was a general desire to have more or less complete galleries of such busts in the museums and libraries. The artists in these works exhibited a singular power of expressing the character of those who were represented, and in this way we possess faithful likenesses of Socrates, Plato, Zeno the Stoic, and other philosophers, of poets and orators such as Isocrates and Demosthenes, of Athenian statesmen and distinguished women. In Rome, the images of the kings and of distinguished men of early times were undoubtedly prepared from the ancestral images which, embossed and painted in wax, were placed in the niches in the atrium of patrician houses. These, however, were either mere fancy portraits, or they exhibited the leading family features of the descendants. The first bust that can be depended upon as giving a correct likeness of the person represented is that of Scipio Africanus the elder. The number of busts belonging to the time of the Roman Empire is very considerable, but those of the Roman poets and men of letters have not been preserved in nearly so large numbers as those of the Greeks. In modern times, in the Valhalla built by Louis I. of Bavaria, and the Hall of Fame (Ruhmeshalle) at Munich, very large and interesting collections of marble busts have been brought together—the works of the leading sculptors of Germany. The chief difficulty in the execution of busts arises from this circumstance, that we are accustomed to estimate the size of the head by comparing it with the whole body. In a bust, therefore, the head appears disproportionately large, and the artist is obliged to yield, in some measure, to this ocular deception, by lessening its natural proportion. The first tolerably complete collection of drawings of antique busts was made by Fulvius Ursinus, and published with the title Illustrium Imagines (Rome, 1569, and Antwerp, 1606); in more recent times, a similar collection was published in the Iconographie Grecque of Visconti (Paris, three vols. 1811), which

was followed by his Iconographie Romaine in 1817–29 (Paris, four vols.)

BUSTARD, the trivial name of a species of wading bird belonging to the genus Otis, and to the family Pressirostres, C. The great bustard (*Otis tarda*) is the largest of European land birds, the male weighing, on an average, 25 pounds. It is 4 feet in length, and measures 9 feet from tip to tip of the wings. The head and neck are ash-coloured, and there is a tuft of feathers about 5 inches long on each side of the lower mandible. The back is transversely barred with black and bright ferruginous colours, and the primaries are black. The tail consists of twenty feathers, broadly barred with red and black. The belly is white, the legs dusky, naked, and without a hind toe. The female is but half the size of the male, and has the crown of the head of a deep orange colour, traversed by red lines; the remainder of the head is brown. She otherwise resembles the male, except that the colour of her plumage is less bright. This species is found in most of the open and level districts of the S. and E. of Europe and in Asia, but is now only a rare visitant to England, though formerly common. They are very shy and vigilant, and by no means easy to shoot. They run with great speed, and aid their course with their wings, like the ostrich. Although they rise on the wing with difficulty, they are said to fly many miles without resting. They feed on grain, seed, worms, &c., and lay two eggs, as large as those of a goose: these are of a pale olive tint, with dark spots. The nest is merely a hole scraped in the earth. They do not wander far from their accustomed haunts, seldom going to a greater distance than 20 or 30 miles. Their flesh is considered fine eating.

BUTCHERS have been much the same in all ages and countries, and we know not of any great improvements that modern art or science has introduced into the practice of slaughtering animals. The ancient Scythians and their Tartar descendants seem to be peculiar in their taste for horse-flesh. The Romans appear to have loved beef, and veal, and mutton, as well as the modern Europeans and their American descendants: '*cara omnia*,' is the complaint of the old comic writer, '*agninam caram, caram bubulam, vitulinam, porcinam, omnia cara*.' In Paris, the butcheries, formerly receptacles of filth, and injurious to health, were removed by Napoleon, by a decree issued in 1807, to the outskirts of the city. They are called *abattoirs* (*abattre*, to fell), and consist of spacious buildings for the reception of the cattle, preparing the tripe, tallow, &c., and reservoirs of water for the service of the establishments. Of these there are five: three on the right and two on the left bank of the Seine. The larger animals are felled by a blow on the head, and the jugular vein is immediately separated with a knife. The flesh is then *blown* (*gonflé*), by injecting air into the vessels through a bellows, which gives it a plump appearance. Every part of the animal—bones, horns, hoofs, blood, intestines, hide, tallow—is used for the fabrication of glue, jelly, Prussian blue, sal-ammoniac, &c. In London, the carcass butchers kill the meat, and supply it in great quantities; the retail butchers sell it out to the consumers. The consumption of meat in England is about 1,650,000 tons annually, or about 100 lbs. per head of population, while France with a larger population consumes only about 900,000 tons, or about 45 lbs. per head. The Jews in London have their own butchers, who are licensed by the rabbis. They cut the throats of the animals, never knocking them down, according to the usual practice. In some countries the method of slaughtering cattle by penetrating the spinal marrow is practised.

BUTCHER'S BROOM (*Ruscus*), a genus of plants belonging to the natural order Liliaceæ. The flowers are dicecious, and of a green colour, and rise from branchlets dilated in the form of leaves, and hence called 'false leaves.' It is a shrubby evergreen plant, with angular stems. There are several species. The *Ruscus hypophyllum* (from Gr. *hypo*, under, and *phyllon*, a leaf, because the flowers arise from the inferior surface of the false leaves) is a native of Italy. The common butcher's broom (*Ruscus aculeatus*) has ovate false leaves ending in spines. The flowers are small, but the berries are large, like small cherries, and remain hanging on the stalks during the autumn and winter. The root and the berries are employed in medicine as diuretics. In some countries its seeds are roasted, and used to make a beverage like coffee. The *Ruscus hypoglossum* is principally distinguished by its elongated bracts, from the axil of which rise the flowers above the false leaves.

BUTE, a small island of Scotland, lying at the mouth of the Clyde, with an area of 30,000 acres, belonging principally to the Marquis of Bute. It is about 15 miles long, and the average breadth is 3½ miles. It has no remarkable elevations, its highest summit, Kames Hill, being only 875 feet high; but it has several pretty little lakes, the principal and most beautiful of which is Loch Fad, 2¼ miles long by a quarter of a mile in breadth, on the banks of which is the house which was the favourite villa of the celebrated tragedian Edmund Kean. Agriculture is in an advanced state, and is yearly improving. A complete system of draining has been introduced, and the most approved rotation of crops is observed. There are 20,000 acres under cultivation. The climate is moist and mild. The herring fishery is a profitable employment. The means of education are ample, there being many well-conducted schools throughout the island. The consequence is that there is scarcely a native inhabitant above fifteen years of age who cannot read and write. The only town is Rothesay, the ruins of the castle of which, formerly inhabited by the Scottish monarchs, still remain. It gave the title of Duke of Rothesay to the heir-apparent of Scotland. The title is now transferred to the Prince of Wales. The islands of Bute, Arran, Great Cumbray, Little Cumbray, Inchmarnock, and Pladda, form the county of Bute. The pop. of the county, in 1861, was 16,331; in 1871, 16,977.

BUTE, JOHN STUART, EARL OF, a British statesman, born in the beginning of the eighteenth century, in Scotland. His ancestors had been elevated to the peerage in 1703, and were connected with the old kings of Scotland. In his youth Bute seemed devoted to pleasure, and little inclined to engage in politics; nevertheless, in 1737, after the death of a Scottish peer, he was chosen to fill his seat in Parliament. In consequence of his opposition to the measures of the ministry he was left out when a new Parliament was convened, in 1741. Offended by this neglect, Bute retired to his estates, and lived there, wholly secluded, till the landing of the Pretender in Scotland, 1745, induced him to go to London, and offer his services to the government. Notwithstanding this manifestation of zeal, he would not have been brought forward again, if he had not attracted the notice of the Prince of Wales, at an exhibition of private theatricals, in consequence of which he was invited to the court. Here he soon gained influence, and succeeded in making himself indispensable to the prince. At his death, in 1751, he was appointed, by the widowed princess, chamberlain to her son, and was intrusted by her with his education. Bute never lost sight of his pupil, and possessed so much more influence with the Princess of Wales than her son's particular tutors, the Earl of

Harcourt and the Bishop of Norwich, that they resigned their offices. Lord Waldegrave and the Bishop of Lincoln, who were chosen in their stead, opposed him unsuccessfully. George II. died Oct. 25, 1760, and two days after Bute was appointed member of the privy-council. In March, 1761, the Parliament was dissolved. Bute was made secretary of state, in the place of Lord Holderness, and appointed Charles Jenkinson, afterwards Lord Hawkesbury and Earl of Liverpool, his under-secretary. Legge, chancellor of the exchequer, was removed. Pitt (the great Chatham), who saw his influence in the new council annihilated, gave in his resignation the same year. This event made an unfavourable impression on the nation; but Bute, possessing the unbounded confidence of his king, stood at the head of the state. Soon after he removed the old Duke of Newcastle, then first lord of the treasury, and the only one of the former ministry remaining in office, and immediately took this important post upon himself, receiving, at the same time, the order of the Garter. After a severe contest in Parliament, he concluded a peace with France. The terms for England were perhaps not disproportionate to the successes obtained during the war; but it was disgraceful that the King of Prussia, in violation of former treaties, should have been left to his fate. Bute was obliged to bear the most bitter reproaches; yet he succeeded in winning the popular favour, and everything seemed to promise the power of the minister a long continuance. The influence of Bute seemed unbounded, when it was made known, contrary to expectation, that he had resigned his office as prime-minister, and was in future to live as a private man. In 1766 Bute declared in the House of Lords that he had wholly withdrawn from public business, and no longer saw the king; still it was not doubted that his great influence continued. On the death of the Princess of Wales, 1772, he seems first to have given up all participation in the affairs of government. He spent his last years on his estate. A costly botanical garden, a library of 30,000 volumes, excellent astronomical, philosophical, and mathematical instruments, afforded him occupation. His favourite study was botany, with which he was intimately acquainted. For the Queen of England he wrote the Botanical Register, which contained all the different kinds of plants in Great Britain (nine vols. 4to). This work is remarkable, both for its splendour, in which it excels all former botanical works, and for its rarity. Only twelve copies were printed, at an expense of more than £10,000 sterling. Bute died in 1792.

BUTLER, James, Duke of Ormond, an eminent statesman in the reigns of Charles I. and II. He was born at London in 1610, succeeded his grandfather in 1632, and although all his connections were Catholics, his wardship being claimed by James I., he was brought up a member of the Church of England, to which he ever after constantly adhered. When Strafford became lord-lieutenant of Ireland, Butler was made commander of the army, but as it consisted of only 3000 men, he could do little more than keep the enemy in check, and was obliged to agree to a cessation of hostilities; after which, having been created a marquis, he was appointed lord-lieutenant. On the ruin of the royal cause he retired to France. After the execution of Charles he returned to Ireland with a view of raising the people; but on the landing of Cromwell he again returned to France. While abroad he exerted himself to further the restoration of Charles; and when that event was brought about by Monk, returned with the king. Before the coronation he was created duke, and assisted at that ceremony as lord high-steward of England. In 1662 he was again appointed lord-lieutenant of Ireland, which country he restored to comparative tranquillity, and was an active benefactor to it by encouraging various improvements, particularly the growth of flax and manufacture of linen. On the exile of Lord Clarendon, his attachment to that nobleman involved Butler in much of the odium attached to him, and although, on his recall from Ireland, nothing, on the most rigorous inquiry, could be proved against him, he was removed by the machinations of Buckingham. In 1670 a desperate design was formed by the noted Colonel Blood, whom he had imprisoned in Ireland, to seize his person and hang him at Tyburn. The project succeeded so far, that he was one night forcibly taken out of his coach in St. James' Street, placed behind a horseman, and carried some distance; but at length he threw the man and himself from the horse by his personal exertions, and obtained assistance before he could be replaced. The king sent Lord Arlington to request the duke to forgive the insult; who calmly replied, that, 'if his majesty could pardon Blood for his attempt to steal the crown, he might easily pardon that upon his life;' adding, that 'he would obey the king without inquiring his reason.' For six years he was deprived of court favour, but at length was again appointed lord-lieutenant of Ireland, which place he held during the remainder of the reign of Charles, but soon after resigned, his principles not suiting the policy of James. He died at his seat in Dorsetshire, in 1688, leaving behind him the character of a man who united the courtier and the man of honour and integrity better than any nobleman of the time.

BUTLER, Joseph, an English prelate of distinguished eminence as a writer on ethics and theology. He was born in 1692, at Wantage, in Berkshire, where his father was a shopkeeper, and a Presbyterian Dissenter. After some previous education at a grammar-school he was sent to an academy at Tewkesbury, with a view to ordination as a minister among the Dissenters. While occupied by his studies he gave a proof of his talents by some acute and ingenious remarks on Dr. Samuel Clarke's Demonstration of the Being and Attributes of God, in private letters addressed to the author. He likewise paid particular attention to the points of controversy between the members of the Established Church and the Dissenters, the result of which was a determination to be no longer a Nonconformist; he therefore removed to Oxford in 1714. Having taken orders, he was in 1718 appointed preacher at the Rolls Chapel, and the sermons which he preached while holding this office, especially the first three, On Human Nature, occupy an important place in the history of ethical science. In 1736 he was appointed clerk of the closet to the queen. The same year he published his celebrated work, the Analogy of Religion, Natural and Revealed, to the Constitution and Course of Nature. In 1738 Dr. Butler was promoted to the bishopric of Bristol on the recommendation of Queen Caroline; and in 1750 obtained his highest preferment—the bishopric of Durham. He died in 1752, and was interred in Bristol Cathedral. A charge delivered to the clergy of the diocese of Durham, on the subject of external religion, together with the circumstance of his setting up a marble cross in his chapel at Bristol, gave rise to suspicions that he was inclined to the principles of Popery; and after his death a report was spread that he had died in the Catholic faith; but this story was satisfactorily contradicted by Archbishop Secker.

BUTLER, Samuel, a celebrated English poet, was the son of a farmer in Strensham, Worcestershire, where he was born in 1612. He passed some time in his youth at Cambridge, but never matriculated

at the university. He resided some time with Sir Samuel Luke, a commander under Cromwell. In this situation Butler acquired the materials for his Hudibras by a study of those around him, and particularly of Sir Samuel himself, a caricature of whom constituted the celebrated knight Hudibras. The first part of Hudibras was published in 1663, and was brought under the notice of the court by the well-known Earl of Dorset. It immediately became highly popular with the prevailing party in church and state, and served as a general source of quotation; the king himself perpetually answering his courtiers out of Hudibras. Celebrated as it rendered its author, it did nothing towards extricating him from indigence. All the bounty of Charles was a gratuity, said to amount to £300. Thus unpatronized, but respected for his integrity and beloved for his social qualities, he died in 1680, and was buried in St. Paul's Church, Covent Garden, at the expense of his friend Mr. Longueville, of the Temple. A monument was, forty years after, erected to his memory, in Westminster Abbey, by Alderman Barber, the printer, lest, as the inscription observes, '*Cui vivo deerant fere omnia, deesset etiam mortuo tumulus*' (he who, when living, wanted everything, should, when dead, also want a tomb). Of Hudibras it is scarcely necessary to observe that, both in its style and matter, it is one of the most original works that was ever written, and that it exhibits the faculty especially denominated *wit*, meaning the power of rapid illustration by remote contingent resemblances, to a most remarkable degree. Possessed of much wit, of great knowledge of life, and extensive learning, Butler united in himself all the requisites for his very peculiar undertaking. As a work intended to ridicule the Puritans the attraction of Hudibras was great, but temporary. As applicable to classes of character which exist for ever, its satire always will be relished. Fanaticism, hypocrisy, and time-serving venality are of all ages. Its diction is admirably adapted for the conveyance of the odd and whimsical notions and associations with which the work abounds. In fact the originality of Butler as to matter elicited equal originality in its delivery. In 1759 appeared the Genuine Remains, in Prose and Verse, of Mr. Butler, from the Original Manuscripts, formerly in the Possession of W. Longueville, Esquire (2 vols. 8vo).

BUTTER, an oily substance usually produced from milk. *Cream* is composed of an oily substance, a caseous matter, and serum or whey. If it be agitated about an hour in a churn a separation of these parts takes place, and a solid called *butter*, and a liquid called *butter-milk*, consisting of the whey and the caseous matter, are the products. The proportion of these products in 100 parts of cream are—

Butter,	4·5
Cheese,	3·5
Whey,	92·0
	100·0

Chemical analysis gives stearine, elaine, and a small quantity of acid and colouring matter, as the component parts of butter. Beckmann (History of Inventions) comes to the conclusion that butter is not of Grecian nor of Roman invention; but that the Greeks received it from the Scythians, Thracians, and Phrygians, and that the Romans derived it from the people of Germany, and used it as a medicine, rather than as a culinary luxury. In warm countries the place of butter is still for the most part supplied by oil. In Italy, Spain, Portugal, and the S. of France it is scarce, and never of superior quality. The difficulty of keeping it any length of time is indeed an effectual barrier to its general use. The ancients appear to have been wholly deficient in the art of giving it consistency. The European countries in which oil or butter is used, says Malte-Brun (Geog. liv. xcv.), may be separated by a line extending along the Pyrenees, the Cevennes, the Alps, and Mount Hæmus. To the N. the pasturage is better; cattle abound, and the food is chiefly derived from them. The olive groves to the S. supersede the use of butter by that of oil. The butter, beer, and animal food of the N. of Europe give way to oil, wine, and bread in the warmer regions. The word *chameah*, translated *butter* in the English version of the Bible, means some liquid preparation of milk or cream. It was in general use among the Celts:—'Spuma id est lactis, concretiorque quam quod serum vocatur, barbararum gentium lautissimus cibus' (Pliny, ix. 41, and xxviii. 9). The Hindus make use of *ghee*, which means butter clarified by boiling. They boil the milk two or three hours, which, when cool, is fermented with curdled milk, left to sour, churned, and when it is sufficiently rancid is boiled, and mixed with salt, or betel-leaf, and ruddle, to improve its taste and colour.—The name of *mineral butters* was given by the old chemists to certain substances which are of the consistence of butter when recently prepared. Among these are butter of antimony, of tin, and of bismuth, which are now called chlorides. *Vegetable butters* are fixed vegetable oils which are solid at common temperatures, such as palm-oil, cocoa-nut oil, shea, nutmeg-oil, &c.

BUTTERFLY, or PAPILIO, the common name of a large group of insects belonging to the Lepidoptera, forming the genus Papilio of Linnæus and the family of Diurna of Latreille, according to whose system the genus Papilio is restricted to such of this family as have naked chrysalids of an angular form, and attached by the tail; the perfect insect has six legs; the internal border of the inferior wings is concave or scalloped; in fact it only includes the first division of the Linnæan genus, viz. the *equites*. The family of the diurnal Lepidoptera (so called because they are diurnal in their habits, to distinguish them from the moths, which are either crepuscular or nocturnal in their habits) is a very extensive one, including many genera and an immense number of species, and naturalists are very far from being at one as to the manner of subdividing the family. By Latreille it is divided into two sections, the first characterized by having only a single pair of spurs on the fourth joint of the legs while the second has two pairs of spurs on the same joint of the hinder legs. The first of these sections is again subdivided into two groups, the Hexapoda (six-footed) and the Tetrapoda (four-footed). The Hexapoda are so called because in them all the six legs are perfectly developed, while in the Tetrapoda one of the three pairs of legs is so imperfectly developed that they may be regarded as having only four legs. The Hexapoda are arranged by Latreille under six genera and the Tetrapoda under twenty. The other of the two sections into which Latreille divides the family of the Diurna is much less numerous than the first, and includes only two genera—Hesperia and the Urania, names adopted by him from Fabricius, who formed the genera.

One of the most remarkable and interesting circumstances connected with this beautiful class is their series of transformations before reaching a perfect state. The female butterfly lays a great quantity of eggs, which produce larvæ, commonly called caterpillars, destructive to the foliage of almost all vegetables, each species of butterfly selecting that kind of vegetable to lay its eggs on which furnishes the proper nourishment for its caterpillars. Thus the common white butterfly selects the cabbage, the peacock butterfly the nettle. After a short life these

assume a new form, and become chrysalids—the tomb of the caterpillar and the cradle of the butterfly. These chrysalids are attached in various ways, and are of various forms—some of a corneous appearance, with brilliant golden or argentine spots; others resembling a silken pod. Within this covering the proscribed and often disgusting caterpillar becomes the agile and brilliant butterfly—a change which poets have made typical of immortality. The larvæ of the butterfly have normally thirteen segments, the first of which forms a distinct head with antennæ, jaws, and usually simple eyes. The three segments behind the head bear each a single pair of legs, in addition to which there is a number of fleshy legs, usually ten, on some of the segments of the abdomen, which are called pro-legs. This name is given to them because they do not finally form part of the butterfly, but are lost in the change from the chrysalis state to that of the perfect insect. The pupæ or chrysalids of the butterfly family are distinguished from those of the moth family by being usually angular, which the latter never are. The mode in which the perfect insect is packed in his narrow cell is very curious. It is fully described in the works of Swammerdam. When the period of its confinement has elapsed, the fly escapes from his prison-house by disgorging a frothy liquor which dissolves the glutinous matter that gives solidity to the chrysalis, and this at last yields to the efforts of the inclosed insect, when it emerges perfectly formed for flight, but unable to use its wings until the air has given them consistence. If, however, the heat of the weather is too great, instead of expanding into a firm and flat membrane they present a folded or corrugated appearance, and are wholly useless. These insects, in their perfect form, take little food: for a short time they void a fluid of a reddish colour, perhaps the remains of food ingested before their last change. A single female butterfly produces several hundred eggs, but their over increase is checked by a host of enemies. A single pair of sparrows, it is calculated, will destroy upwards of 3000 caterpillars in a week; great numbers are also killed by a species of fly which deposits its eggs in the caterpillar, where they hatch, and the produced larvæ feed on the internal parts of their unhappy nurse. See Cramer, Réaumur, Madame Merian, &c.

BUTTONS are of almost all forms and materials —wood, horn, bone, ivory, steel, copper, silver, brass, &c.—which are either left naked or covered with silk or some other material. In order that the button may be attached to the garment it must either be pierced with one or more holes, or it must have what is called a shank; that is, some means of attachment on the under side. Of course a single hole will only do when the button is a covered one; in other cases from two to four holes are pierced. When the material of which the button is made is a comparatively soft one, such as wood, bone, &c., the holes are pierced by means of a lathe. If there is only one hole, it may be made by the same operation by which the button is cut out, a centre-bit with three points being used, the central one of which pierces the hole, while the outer ones describe the circumference. When there are two or more holes the button must be cut out by one operation, and the holes pierced by another. In making buttons of horn, the horn is first softened in boiling water and then cut into small squares of the thickness of the button, and the squares are next converted into octagons by having the angles cut off. The pieces thus formed are then heated in a stove to a temperature of 212° Fahr. or more, and afterwards stamped by dies. Their angles are then cut off by means of strong scissors, and finally rounded off and polished with a file.

Metal buttons are commonly made of tin, or a mixture of tin and brass. Tin buttons are generally cast in iron or brass moulds, which are either smooth or engraved according to the kind of button that one intends to make. Sometimes the ring or 'shank' of the button is cast at the same time; but the most common way is to make the shank of brass-wire, covered with a coating of some substance less easily oxidized, and to introduce it into the mould in such a manner that when the button is cast the shank is fixed in its proper place. The buttons made of a mixture of brass and tin, to which there is sometimes added a small proportion of zinc to render the compound more fusible, are for the most part cast in sand. The method of casting by flasks (see CASTING) is employed, and the model used to make the impression in the sand consists of a frame-work of from four to twelve dozen button-models placed as close to one another as possible, and connected by bars, which form in the sand channels for the fused metal. After the impression in the sand has been made, the under flask is carefully removed, and the shank of each button is buried in the depressions, so that when the model is withdrawn, and the cast has been made, the buttons appear complete with the shanks fastened to them. After the casting the buttons are separated from one another, and are then taken to a lathe, where they are dressed and polished. The following is the method of making gilt, brass, or copper buttons. The brass or copper is first made into sheets of the proper thickness. From these disks of the size of the buttons are cut out, which after being softened by heat, are stamped by dies, which impress the maker's name on the circumference, and at the same time give the buttons a slightly convex form so as to prevent them from adhering to one another in the process of gilding. The shanks are then soldered on, and the buttons polished and freed from verdigris. The buttons are then put in an earthen vessel along with a quantity of gold amalgamated with mercury, to which a small quantity of aqua fortis is added. The buttons are then stirred in the vessel until each of them receives a uniform coating of the amalgam, and finally, after they have undergone a process which carries off the mercury, they are washed and polished. Silver-plated buttons are made from sheets of copper plated on one surface with silver. In this case also dies are used, and the edges of the lower die are slightly raised, so that when the buttons are stamped, the silver side being always next the lower die, the edges of the buttons are covered with a thin plate of silver. As before, the buttons, after having the shanks soldered on, are now turned and polished, and their under side is freed from verdigris. A kind of button has recently been manufactured which may be called semi-metallic, inasmuch as it is made of two metal disks with cloth firmly pressed between them. Both of the metal disks are pierced with a single hole in the centre. The upper disk is slightly larger than the lower, which is made to fit into it tightly, the cloth being pressed between the two. The advantages of this button are that it is easily made, and that it may easily be attached to the garment by the tailor. Of late years the making of porcelain buttons has developed into a remarkable industry. A patent was taken out in England for this manufacture by Mr. Prosser about 1840, and for some time buttons were manufactured in Birmingham under Prosser's patent. The manufacture, however, has been abandoned in England; but is now carried on in France on an extensive scale, and with some improvements in the process. These buttons are both strong and cheap.

In making covered buttons according to the method now adopted, two metal disks called blanks are used,

one of which is somewhat larger than the other. Covered buttons are of two kinds, some having no shank, the others having what is called the flexible shank. In the first case both the two metal blanks are pierced with a hole in the centre, generally having a bar across the hole for the thread to pass over. To make a button of this kind all that is necessary is to turn up the edges of the larger blank by means of a die, to insert the smaller blank (also called a 'collet'), which ought to fit as tightly as possible into the larger, and then to stretch the linen or other material over both. This is the common flat button used for underclothing. In making the flexible shank-button the larger blank is not pierced, but its edges are turned up as in the former case. Two cloth blanks are also required, one of which is larger than the larger of the two metal blanks, over which it is tightly stretched, its edges being turned over those of the metal blank. The button now receives a padding of paper and cloth, above which is put the smaller cloth blank, and above that again the collet or smaller metal blank, which is made slightly concave, and inserted with the concavity towards the inside. The whole is then pressed firmly together, the edges of the outer blank being turned inwards over the collet so as to hold it fast in its place. At the same time the pressure to which the button is subjected causes the padding to project through the hole that is left in the collet, so as to form the flexible shank from which the button receives its name.

BUTTRESSES, in Gothic architecture, are lateral projections on the outside of the walls of an edifice, extending from the top to the bottom at the corners and between the windows. They are necessary to support the walls and prevent them from spreading under the weight of the roof.

BUXTON, a market-town in the county of Derby, England, situated in a valley celebrated for its mineral waters. The springs discharge 60 gallons a minute: the temperature of the water is 82°. It is colourless, and devoid of taste or smell. It contains calcareous earth, vitriolic selenite, and sea-salt, and is an active remedy in nephritic and bilious complaints. It is used both externally and internally. The accommodation for visitors who come to drink the waters is very complete, including excellent hotels and lodging-houses, baths, assembly-rooms, and pump-room. The surrounding scenery is fine, and there is a vast stalactite cavern called Poole's Hole in the neighbourhood. Buxton was known to the Romans; and the unfortunate Mary Stuart while in captivity resided some time at the Hall. Pop. in 1861, 1877; in 1871, 3717.

BUXTON, Sir Thomas Fowell, born at Earl's Colne in Essex in 1786, was educated under Dr. Burney at Greenwich, and afterwards at Trinity College, Dublin, where he carried off the gold medal. In 1811 he joined the firm of the celebrated brewers, Truman, Hanbury, & Co., and took an active share in carrying on the business. In 1816, on the occasion of the Spitalfields distress, he made his first public effort in a speech at the Mansion-house, and afterwards succeeded in organizing an extensive system of relief. He next proceeded, in concert with his sister-in-law, the celebrated Mrs. Fry, to examine into the state of prisons; and as the result of his inquiries produced a work entitled An Inquiry whether Crime and Misery are Produced or Prevented by our present System of Prison Discipline, which attracted great attention, and led to the formation of the Prison Discipline Society. In 1818 he was elected M.P. for Weymouth, and continued to sit for it in successive Parliaments till 1837. He distinguished himself by his enlightened zeal in the cause of humanity, and was long the right-hand man of Wilberforce, who on retiring from public life selected Buxton as the person best qualified to carry out those of his benevolent schemes which remained uncompleted. In 1823 he moved, and with a slight modification carried, a resolution to the effect that slavery, being repugnant to the Christian religion and the British constitution, ought to be abolished. Subsequently in 1831 he made such an impression on the house and country by an admirable speech that government were glad to take the matter into their own hands, and give full effect to emancipation. After his retirement from Parliament the slave-trade occupied much of his thoughts, and he published a work entitled The Slave-trade and its Remedy. This led to the expedition to the Niger, which owing to the deadly nature of the climate, notwithstanding the careful precautions used, unhappily failed. In 1840 he was created a baronet. He died in 1845.

BUXTORF, Johann, an eminent orientalist, was born in 1564 at Kamen in Westphalia. Being very learned in Hebrew and Chaldaic, in the acquirement of which he obtained the assistance of many learned Jews, he was engaged by the magistrates of Basel to become professor of those languages, which he taught with great success. He died at Basel in 1629. His works are: Lexicon Chaldaicum Thalmudicum et Rabbinicum; Thesaurus Linguæ Hebraicæ; Hebrew Bible, with the Rabbinical and Chaldaic Paraphrases, the Massora, &c.; Hebrew and Chaldaic Dictionary; Hebrew Grammar; Synagoga Judaica, a Collection of Modes and Ceremonies; Bibliotheca Rabbinica; Institutio Epistolaris Hebraica; Concordantiæ Hebraicæ, &c. His son Johann was also eminent in the same branches of study. He was born in 1599 and died in 1664.

BUZZARD. The buzzards, according to the arrangement of the Falconidæ which was made by Vigors, form one of the sub-families (Buteonina) of the diurnal birds of prey; characters, a moderate-sized beak, hooked from the base; tail equal. They differ from the falcons chiefly in having a weaker and more elongated bill, in having the third or fourth quill longest, and in wanting the notch or tooth on the upper mandible that is so characteristic of the former. The sub-family consists of several genera. The true buzzards belong to the genus Buteo, the characters of which are: bill moderate, rather weak; nostrils somewhat rounded; tarsi short; acrotarsia scutellated; fourth quill longest. The tarsi are either covered with feathers to the toes or half-way. The common buzzard (*Buteo vulgaris*) is distributed over the whole of Europe as well as the N. of Africa and America. In England, Scotland, and Ireland it is in many parts not uncommon, though gradually becoming rarer. It inhabits a variety of situations—rocks, parks, woody districts, &c. Its flight is slow and steady, and it does not generally remain long on the wing. Its food is very miscellaneous, and consists of moles, field-mice, leverets, frogs, toads, worms, insects, birds, and rabbits. The beginning of March is the time at which they pair, and the nest is placed in the fork of a tree or in clefts and ledges of rocks and ravines. It is built of sticks and lined with moss, hair, wool, or other soft materials. The eggs are two, three, or four in number, of an oval form, nearly approaching to round. The colour varies, but generally they are of a bluish or greenish white, spotted with pale or yellowish brown. The length of the buzzard is from 20 to 22 inches, the female being the larger. The plumage is loose and downy; the upper part of the head, the occiput, and cheeks pale brown, streaked longitudinally with darker brown; the whole of the back, wing-coverts, upper tail-coverts, and upper surface of the tail-feathers dark clove-brown, the latter barred with lighter brown, and the feathers

on the former-named parts having the edges lighter coloured; chin and throat almost white; front of the neck, breast, under wing-coverts, belly, and thighs, grayish-white, barred transversely with dark wood-brown; legs and toes yellow; claws black.—The rough-legged buzzard (*B. lagopus*), so called from having its legs feathered to the toes, is also a native of this country. Its habits resemble those of the common buzzard, and like that bird its plumage varies much in colour. The prevailing colours are brown above and whitish streaked and spotted with brown beneath, the lower part of the breast having a belt of brown; length 22 to 24 inches. The genus Pernis, to which the honey-buzzard (*P. apivorus*) belongs, has the third quill longest, and the beak rather weaker than Buteo; in other respects it does not differ much from that genus. The honey-buzzard is rather a rare bird in this country, though pretty common in most parts of Europe. It is about 2 feet in length. It feeds on small quadrupeds, birds, reptiles, and insects, especially bees, and should rather be called *bee-buzzard* than honey-buzzard. The marsh-harrier (*Circus æruginosus*) and the hen-harrier (*C. cyaneus*), both natives of this country, belong to the same sub-family.

BY-LAW is a particular law made by a corporation, or by any other distinct portion of the community, for the regulation of the affairs of its members in such of their relations as are not reached by the general law of the land. Such private laws may legally be made by all incorporated bodies, as civic corporations, trading companies, &c., and even by the body of the inhabitants of a town or parish, provided they involve the infraction of no public laws, but are merely calculated to supply their want of application in the particular instance. These private laws are binding only on the members of the body for which they are framed, and will not be recognized as valid unless they appear to be intended for the general good of that body, and not for the mere furtherance of private or personal interests. By the Municipal Corporation Act (5 and 6 William IV. cap. lxxvi.) town-councils are permitted to make such by-laws as may seem to them necessary for the prevention and suppression of such nuisances as are not already made punishable in a summary manner. By 8 Vict. cap. xx., the power of making by-laws was granted to railway companies.

BYNG, JOHN, served under his father, Admiral George Byng, and by his merits, as well as the influence of his name, was raised to the rank of admiral. His attempts to relieve Fort St. Philip, in Minorca, when blockaded by a French fleet under La Galissonière, proved abortive; and his hesitation in engaging the enemy, when a bold attack might have perhaps gained him the victory, excited the clamour of the nation against him. The ministry, who wished to avert the public odium from their unsuccessful measures, beheld with seeming satisfaction the unpopularity of Byng; and when he was condemned by a court-martial they suffered him, though recommended to mercy, to be sacrificed to the general indignation, and he was shot at Portsmouth, March 14, 1757, meeting his death with calm resignation.

BYNKERSHOECK, CORNELIUS VAN, a Dutch lawyer, born at Middleburg in 1673. He studied at the University of Franeker, and after practising as a barrister at the Hague, became professor of law at Leyden, and president of the Council of Holland. He died in 1743. Bynkershoeck was one of the most learned among modern civilians. His works were published at Geneva in 1761, and at Leyden in 1766. They are written in Latin; and his treatise De Foro Legatorum Competente was translated by Barbeyrac into French under the title of Du Juge compétent des Ambassadeurs, 1723, 4to. Bynkershoeck edited a periodical publication called The New Mercury of the Hague, which was suppressed owing to the offence taken at the strain of satire which it exhibited.

BYRGIUS, JUSTUS (properly *Jobst Bürgi*), a celebrated mechanist and astronomer, born at Lichtenstein in Switzerland in 1552, was invited to Cassel by the Landgrave of Hesse to superintend the observatory which he had there erected, and constructed a number of astronomical instruments, some curious clocks, and other machines. A discovery involving that of the logarithms, and another exhibiting an application of the pendulum to clocks, have been attributed to him. He is eulogized by Kepler for his talents, but censured for his indolence and undue reserve, which kept back his discoveries from the public. He died in 1632 or 1633.

BYRON, GEORGE GORDON NOEL, LORD BYRON, an English peer and poet of elevated genius, was born in Holles Street, London, Jan. 22, 1788. He was the grandson of Admiral John Byron (see next article), and son of the admiral's only son, Captain John Byron, of the Guards, notorious for his gallantries and reckless dissipation. By the eccentricity and misconduct of the old Lord Byron, and of the captain his nephew, the reputation of the family of Byron, so ancient and honourable in English history, had been considerably tarnished. The former was tried by his peers for killing his relation, Mr. Chaworth, in a combat with swords, after a tavern dispute, under circumstances so equivocal that he was indicted for murder, and made a very narrow escape from the penalty attendant upon man-slaughter—an escape which did not prevent him from being consigned, by public opinion, to a life of seclusion and obscurity. Captain Byron, the poet's father, was so dissipated that he obtained the name of the Mad Jack Byron. He was one of the handsomest men of his day, but so immersed in all the fashionable vices, that, at length, to be seen in his company was deemed discreditable. In his twenty-seventh year he seduced Amelia, marchioness of Carmarthen, daughter of the Earl of Holdernesse, to whom, on a divorce following, he was united in marriage. This ceremony the ill-fated lady did not survive more than two years, when he took, for a second wife, Miss Catherine Gordon, heiress of Gight in Aberdeenshire, whose fortune he quickly dissipated, leaving her a destitute widow in 1791, with a son, the celebrated subject of this article, then only three years of age. Previously to the death of her husband, having been deserted by him, Mrs. Byron retired with her infant son to her native place, Aberdeen, where she lived in seclusion on the ruins of her fortune. The singular circumstances attendant upon the early childhood of Byron seem to have operated materially in the formation of his very striking character. Until seven years of age, the care of his education rested solely on his mother, to whose excusable, but injudicious indulgence, some of the waywardness by which it was subsequently marked was, even by himself, attributed. Being then of a weakly constitution, that disadvantage, added to a slight malformation in one of his feet, naturally rendered him an object of peculiar solicitude; and to invigorate his constitution, he was not sent to school, but allowed to brace his limbs upon the mountains in the neighbourhood; where he early acquired associations, and accumulated a fund of legendary lore, which indisputably nurtured his poetical tendencies. At the age of seven he was sent to the grammar-school at Aberdeen, where he was more distinguished for great occasional exertions, in order to make up for the intervals of absence rendered

necessary by his delicacy of health, than by his general application. In all boyish sports, however, the ardour of his temperament enabled him to surmount his natural disadvantages. In 1798 the death of his grand-uncle, without issue, gave him the titles and estates of the family; on which, being then ten years of age, he was removed from the immediate care of his mother, and placed under the guardianship of the Earl of Carlisle, who had married the sister of the late Lord Byron, a lady of considerable poetical abilities. On this change the youthful lord was placed at Harrow, where he distinguished himself more by his love of manly sports, and by his undaunted spirit, than by attention to his studies, or submission to school discipline; but although in a subsequent part of his life he indulged in some animadversions upon the tendency of the system in public schools, he always cherished an affectionate remembrance of Harrow, and of its master, Dr. Drury. While yet at school he fell deeply in love with Miss Chaworth, the daughter and heiress of a gentleman who had fallen by the hand of his grand-uncle, whom he met with on his occasional visits to Newstead. This lady, to whom he very beautifully alludes in a well-known poetical Dream, although some interviews and billets seem to have passed between them, ultimately married another and more mature suitor. This disappointment exceedingly wounded the ardent spirit of the youthful lover. When between sixteen and seventeen, he was entered of Trinity College, Cambridge; and here, as at Harrow, his dislike of discipline subjected him to much merited reproof, which he repaid with sarcasm and satire; and among other practical jokes, kept a bear, which, he observed, he was training up for a degree. At nineteen he quitted the university, and took up his residence at the family seat of Newstead Abbey, where he employed himself chiefly in amusement, and especially in aquatic sports and swimming. In 1807, while still at Newstead, he arranged his early productions, which he caused to be printed at Newark, under the title of Hours of Idleness, by George Noel Gordon Lord Byron, a Minor. These poems, although exhibiting some indication of the future poet, also betrayed several marks of juvenility and imitation, which induced the Edinburgh reviewers to indulge in an attack, much less distinguished for wit or acumen, than for unreasonable causticity and ill nature. The ridicule produced by this critique roused the anger of the poet, who took revenge in his celebrated satire of English Bards and Scotch Reviewers (Mar. 1809). The spirit of resentment is seldom very just; and the anger, rather than the judgment of Byron, guided his pen on this occasion. It happened too, singularly enough, that, owing to party and other predilections, a number of the persons satirized in this poem, no long time after, were numbered among the friends of the author; for which reason, after it had passed through four editions, he suppressed it. It is unpleasant to relate that, about this time, Byron fell into a career of dissipation too prevalent among the youthful possessors of rank and fortune, when altogether uncontrolled. Thus his fortune became deeply involved before he had attained legal maturity, and his constitution much impaired by the excesses in which he spent it. This course of life, however, could not last, and in the year 1809 he determined to travel. Accordingly, in company with his fellow-collegian, John Cam Hobhouse, Esq., afterwards Lord Broughton (see BROUGHTON), he embarked at Falmouth for Lisbon, and proceeded through the southern provinces of Spain to the Mediterranean. His subsequent peregrinations in Greece, Turkey, &c., need not be detailed here, having been rendered so famous by his fine poem of Childe Harold's Pilgrimage. He returned home in June, 1811, after an absence of two years, and had not long arrived before he was summoned to Newstead, in consequence of the dangerous illness of his mother, who breathed her last before he could reach her.

In 1812 Byron gave to the world the first two cantos of Childe Harold's Pilgrimage. This assumption of the character of a wayward libertine, satiated by an over cultivation of pleasure, into misanthropy, tedium, and listlessness, and that in such a manner that the application would necessarily be made to himself, afforded proof both of the perverted feeling and of the originality of Byron. There was, however, a boldness in the repulsive personification, and a force and an energy in the mode of supporting it, so indicative of great powers, that it at once produced a strong impression. Eulogy now flowed in from all quarters. Even the readers who disapproved of the misanthropy and sombre views of human nature displayed in this extraordinary production, confessed its genius. Thus the feelings of admiration became general, and the strong current of fashion turning directly in his favour, his acquaintance was widely, not to say universally, courted; and his first entry on the stage of public life may be dated from this era. Nor were the manners, person, and conversation of Byron of a nature to dissipate the charm with which his talents had invested him. Although easy and affable in his general manners, the latent reserve of conscious genius was always observable; added to which, the associations connected with his identification with his own Childe Harold excited a mysterious and undefinable curiosity. Even his physiognomy was eminently calculated to keep up the interest which he otherwise inspired; the predominating expression of his fine features being that of deep and habitual thought, although, when engaged in interesting discussion, they as forcibly exhibited gaiety, indignation, and satire. Thus, in the imitative world of fashion, the enthusiastic looked on him to admire, the serious to admonish, and the soft with a desire to console. The latter sympathy he excited too powerfully in certain quarters, and a course of noxious intrigue was the consequence. It is more gratifying to observe that, in the midst of all this license, he was capable of delicate and generous actions, of which a number of well-authenticated instances are on record. The quick and scrutinizing glance which he had cast on eastern character and manners was now manifested in the Giaour, the Bride of Abydos, the Corsair (the copyright of which, as well as that of Childe Harold, he gave to Mr. Dallas), Lara, and the Siege of Corinth, which followed one another in quick succession, in the course of the two years 1813 and 1814. For parliamentary duties he seems to have had a decided distaste, and it was not until his return from the Continent that he ventured to speak. He made his maiden speech in February, 1812, from the opposition bench, against the Frame-work Bill, and was argumentative and lively, if not very original. Having now become a character whose support might be of considerable consequence, he was congratulated accordingly. Another time he addressed the house in support of Catholic Emancipation, and a third and last time on presenting a petition from Major Cartwright.

On the 2d of January, 1815, Byron married Anna Isabella, only daughter of Sir Ralph Milbanke Noel. Their married life had not lasted long when it was disturbed by pecuniary embarrassments, in consequence of which it was settled that Lady Byron, who had presented his lordship with a daughter on the 10th of December, should return to her parents until better arrangements could be made. From this visit

Lady Byron ultimately refused to return, and a formal separation ensued. The real reason of Lady Byron's separation from her husband is still uncertain; for the reason which Mrs. Stowe laid before the public in 1869, alleging it to be the real one as stated by Lady Byron herself, seems inconsistent with the circumstances of the case, and with Lady Byron's own conduct. This rupture produced a considerable sensation in the world of fashion, and the most contradictory rumours prevailed, in the midst of which Byron left England, with an expressed resolution never to return. He visited France, the field of Waterloo and Brussels, the banks of the Rhine, Switzerland, and the N. of Italy, and for some time took up his abode at Venice. Here he was joined by Mr. Hobhouse, who accompanied him on a visit to Rome, where he completed his third canto of Childe Harold. Not long after appeared the Prisoner of Chillon, a Dream, and other Poems; and in 1817 Manfred, a tragedy, and the Lament of Tasso. In one of his excursions from Italy he resided for some time at Abydos, and thence proceeded to Tenedos and the Island of Scio, where he likewise stayed three months, during which time he visited every classical scene, and frequently slept in the peasants' cottages, to whom his liberality made him a welcome guest. He also visited several other islands, and at length repaired to Athens, where he sketched many of the scenes of the fourth and last canto of Childe Harold, which poem was published in 1818, and sustained the high reputation of the author. In the same year appeared the jeu d'esprit of Beppo, in the mixed and pointed manner of the Italian style of poetical humour, and marked by a tone of loose morality, which ripened into licentiousness in Don Juan. In 1819 was published the romantic tale of Mazeppa, and the same year was marked by the commencement of Don Juan, which his bookseller, Mr. Murray, declined openly to publish. Of this celebrated production it is as vain to deny the profligacy as the genius. In 1820 was published Marino Faliero, Doge of Venice, a tragedy, written with an avowed attention to the exploded system of the dramatic unities, which too frequently subtracts from the interest all that it gives to more cold and classical qualities; nor did this effort of Byron's prove an exception. The next year he addressed a letter to Mr. W. Lisle Bowles, in defence of the poetical character of Pope, which had been rated very low in that writer's life of him. This dispute arose out of a disposition, in certain critics, to ground poetical character exclusively on a tendency to deal with the primary associations connected with natural objects and affections, rather than on the more complex and factitious combinations produced by art and cultivation. This school not unfrequently pushes its theory to an extreme, as in the case of Pope, whom Byron, on the other hand, may have somewhat hyperbolically exalted. In the same year appeared the drama of Sardanapalus, indisputably the finest of his tragic offspring; the Two Foscari, a tragedy; and Cain, a mystery. The last is a production of much power, but marked by the same rashness of speculation and recklessness of moral effect which disfigure many of the author's productions.

After leaving Venice Byron resided for some time at Ravenna, then at Pisa, and lastly at Genoa. At Ravenna he became intimate with the Countess Guiccioli, a married lady; and when he removed to Pisa she followed him. Here they both lived together openly in the Lanfranchi Palace. It was at Pisa that in 1822, in conjunction with Leigh Hunt, who, on invitation, had become his guest, and Percy Bysshe Shelley, the periodical publication called the Liberal was commenced, which, principally owing to the unhappy fate of Shelley (who perished by the upsetting of a boat in the Mediterranean), extended only to four numbers. In this work first appeared the Vision of Judgment, caused by the singularly ill-judged performance, under the same title, of Southey. The publisher was prosecuted, and fined £100. Heaven and Earth, a mystery, also first appeared in the Liberal. It is founded on the supposed intercourse between angels and the daughters of earth before the flood, and possesses great force and beauty. The later cantos of Don Juan, with Werner, a tragedy, and the Deformed Transformed, a fragment, bring up the rear of Byron's performances. In the autumn of 1822 he quitted Pisa, and wintered at Genoa, and now began to indulge those feelings, in regard to the efforts of the Greeks to throw off the Mohammedan yoke, which determined him to lend them the aid of his person, purse, and influence. It would also appear by some noble verses which have been printed since his death, that a secret consciousness of his career of action having too long been unworthy of him, induced him to seek a nobler species of distinction than one of mere self-engrossment and successful gallantry. It is unnecessary to dwell upon the general tendency of powerful minds, at a particular stage of existence, to break from the enthralments of pleasure and the senses, because it has been the great theme of allegory ever since allegory was invented. In addition to being satiated with the usual enjoyments of a dissipated man of rank, and disgusted with the sameness of commonplace life, many circumstances contributed to render Byron an enthusiast for Greece. In common with many more, the associations connected with its illustrious history doubtless served to stimulate his concern for its modern degradation; but in him these feelings were quickened by an acquaintance with its grand and beautiful scenery, its various races of wild and picturesque manners, and by the personal interest which he had already excited there. Whatever may have been the exact combination of motive, in August, 1823, he embarked, accompanied by five or six friends, in a British vessel, which he had hired for the purpose, and arrived at the commencement of the third campaign. He established himself some time in Cephalonia, and despatched his friends, Messrs. Trelawney and Hamilton Brown, with a letter to the Greek government. The result of their information induced him to advance £12,000 for the relief of Missolonghi. The dissensions among the Greeks gave him great pain, and involved him in considerable difficulties. At length he sailed from Argostoli with two Ionian vessels, and, taking considerable specie on board, proceeded to Missolonghi, where, after considerable hazard and danger, and the loss of one of his vessels, he finally arrived, and was received with every mark of honour Grecian gratitude could devise. His influence was immediately exerted in the mitigation of the ferocity with which the war was waged on the part of the Greeks; but it was much more difficult to produce union among their leaders. He immediately began to form a brigade of Suliotes, 500 of whom were taken into his pay, with a view to an expedition against Lepanto; but such was the disorderly and unsettled temper of these troops, that he was obliged to postpone it. This unexpected disappointment preyed on his spirits, and, Feb. 15, he was attacked with a severe fit of epilepsy. He had, subsequently, other attacks, but at length the violence of the disorder began to yield to the skill of his physician, and he was recommended to remove for a while from the flat, marshy, and unhealthy site of Missolonghi, to Zante. This step, with his usual

tenacity, he refused to take. 'I cannot quit Greece (he wrote to a friend) while there is a chance of my being even of supposed utility. There is a stake worth millions such as I am, and while I can stand at all I must stand by the cause. While I say this, I am aware of the difficulties, dissensions, and defects of the Greeks themselves; but allowance must be made for them by all reasonable people.' On the expedition against Lepanto being given up, other projects were proposed with reference both to military operations and to congresses for uniting Eastern and Western Greece; but, unhappily, the fatal moment was at hand which was to deprive the Greek cause of its firm and energetic friend. On the 9th of April, Byron, while riding out, got extremely wet; and, scarcely recovered from the effects of his former disorder, a fever ensued, which, it is thought, might have yielded to copious bleeding in the first instance, but which, owing either to his own objection or the inaccurate opinion of the physician of the nature of the disease, was destined to prove fatal on the evening of the 19th of April, 1824. During his illness some fine traits of humanity and feeling for his attendants were exhibited by Byron, and nearly his last words, previous to sinking into the lethargy which ended in death, were, 'My wife, my child, my sister!—you know all—you must say all.' His utterance then failed him, as it had previously done in referring to the same near connections.

Thus, in his thirty-seventh year, prematurely died this extraordinary genius, to the deep affliction of the people whose cause he had espoused, who decreed every possible public testimony of their sorrow. Nor was his death a subject of less regret to many who looked for a noble recompense in the maturity of his life for the faults of its commencement and subsequent progress. Many of his errors were evidently the result of a too early release from all discipline and control, and the neglect which family circumstances had thrown round him. In other respects, the vices and failings of Byron, undeniable, it is true, were much magnified by the peculiarity of his genius and character, which attracted an intensity of observation to all which concerned him. The disposition of the public at once to admire and condemn, accompanied as it was with an involuntary tendency to confound the character of the poet with some of the most romantic creations of his imagination, however it might annoy him in the first instance, in the sequel too obviously nurtured a degree of personal vanity, which formed one of the greatest weaknesses of his character. Commonplace censure produces little effect when coupled with great admiration, and still less is effected by the virulence of party attack, or by direct personal hostility. The morals of Byron, on the score of gallantry, his carelessness of female reputation, and hasty and vindictive spirit of resentment, are altogether indefensible; but it is certain that they were mixed up with great humanity, benevolence, and generosity. It was evident, too, from his death, and many other circumstances, that, whatever his pride and resentment at being so decisively abandoned, he nurtured the natural feelings of a husband and father deep in his bosom. In respect to several disputed points of his conduct, the Memoirs, by himself (which he gave to Moore to raise a loan from Murray, the bookseller, and which that gentleman, at the instance of his family, thought proper to destroy), would doubtless have given much information to the world. As it is, certain journals of visitors, and of temporary companions, professing to record his conversation, but poorly supply their place. The body of Byron was brought to England, and lay in state in London. It was subsequently interred near his own seat of Newstead Abbey, where a plain marble slab merely records his name and title, date of death, and age. Besides his only legitimate child and heiress, Byron left another daughter in Italy, to whom he bequeathed £5000, on the condition of her not marrying an Englishman. The successor to his estate and title was his cousin, Captain George Anson Byron, of the royal navy.

BYRON, JOHN, an English commodore, was born in the year 1723, and embarked, at the age of seventeen, in one of the ships of Lord Anson, which was fitted out for a voyage round the world, but was wrecked on the coast of the Pacific, N. of the Straits of Magellan. Byron, with some of his unfortunate companions, was conducted by the Indians to Chili, and remained there till 1744, when he embarked on board a ship of St. Malo, and in 1745 returned to Europe. At a subsequent period he published a Narrative of his adventures, which is extremely interesting. In 1758 he commanded three ships of the line, and distinguished himself in the war against France. George III., who wished to explore the part of the Atlantic Ocean between the Cape of Good Hope and the southern part of America, gave Byron the command of a frigate, with which he set sail, June, 1764. After having circumnavigated the globe, he returned at the end of two years to England, where he arrived in May, 1766. Although Byron's voyage was not fruitful in discoveries, it still deserves an honourable place in the history of voyages round the world, since he was the first of those renowned circumnavigators of the globe, including Wallis, Carteret, and Cook, whose enterprises were not merely mercantile, but were directed to scientific objects. In 1769 Commodore Byron was appointed to the government of Newfoundland, which he held till 1775. He was raised to the rank of vice-admiral of the white in 1779, and died in 1786. Such was his general ill fortune at sea, that he was called by the sailors 'Foul-weather Jack.'

BYRON'S ISLAND, a small island in the Pacific, about 12 miles in length, abounding in cocoa trees. It was discovered by Commodore Byron in 1765. Lon. 177° 45′ E.; lat. 1° 18′ S.

BYSSUS, a kind of fine flax and the linen made from it, was used in India and likewise in Egypt at a very early date. In this latter country it was used in embalming, and the mummies are still found wrapped in it. As an article of dress it was worn only by the rich. Dives, in Christ's parable (Luke xvi. 19), was clothed in byssus, and it is mentioned among the riches of fallen Babylon (Rev. xviii. 12). Byssus was formerly erroneously considered as a fine kind of cotton. The fine stuff manufactured from the byssus is called more particularly *sindon*. Foster derives the word *byssus* from the Coptic. Byssus was also used by the ancients, and is still used, to signify the hair or thread-like substance (called *beard*), with which the different kinds of sea-mussels fasten themselves to the rocks. The *Pinna marina*, particularly, is distinguished by the length and the silky fineness of its beard, from which very durable cloths, gloves, and stockings are still manufactured in Sicily and Calabria. Various articles made of byssus appeared at the Great Exhibition in 1851.

BYTTNERIACEÆ (or more properly BÜTTNERIACEÆ, since the typical genus of this order was dedicated to, and named after the botanist Büttner), a nat. order of exogenous plants, with the following characteristics. The members of this order are trees or shrubs, with simple alternate leaves, and opposite stipules; flowers disposed in clusters, which are axillar or opposite to the leaves; calyx and corolla with five divisions, but the latter sometimes wanting; stamens of the same number as the petals, or double or multiple, in general monadelphous; anthers always

two-celled; carpels, from three to five in number, more or less completely united, each cell with two or three ascending ovules or a greater number; styles free, or more or less united; fruit generally a globular capsule dehiscent or indehiscent. This order is distinguished from the Malvaceæ by its two-celled anthers, and by the fact that its seeds are generally furnished with a fleshy endosperm. The order is divided into six sub-orders, one of which takes its name from the genus Byttneria, which gives its name to the whole order. The chief genus of this sub-order is *Theobroma cacao*, from the seeds of which cocoa is prepared. The genus Guazuma, a native of Brazil, belonging to the same sub-order, is cultivated for the sake of its fruit, which is edible, and filled with a sweet and pleasant mucilage. Another genus of this sub-order, namely, Abroma, is valuable on account of its fibre, from which strong cordage is manufactured. The genus Astropæa is said to contain the most beautiful plants: all the species are remarkable for the mucilage they contain.

BYZANTINE EMPIRE. The Byzantine or Eastern Roman Empire comprehended at first in Asia the country on this side of the Euphrates, the coasts of the Black Sea, and Asia Minor; in Africa, Egypt; and in Europe, all the countries from the Hellespont to the Adriatic and the Danube. This survived the Western Empire 1000 years, and was even increased by the addition of Italy and the coasts of the Mediterranean. It commenced in 395, when Theodosius divided the Roman empire between his two sons Arcadius and Honorius. The Eastern Empire fell to the elder, Arcadius, through whose weakness it suffered many misfortunes. During his minority Rufinus was his guardian and minister, between whom and Stilicho, the minister of the Western Empire, a fierce rivalry existed. The Goths laid waste Greece. Eutropius, the successor, and Gainas, the murderer of Rufinus, were ruined by their own crimes. The latter lost his life in a civil war excited by him (400). Arcadius and his empire were now ruled by his proud and covetous wife Eudoxia, till her death (404). The Isaurians and the Huns wasted the provinces of Asia and the country along the Danube. Theodosius the Younger succeeded his father (408), under the guardianship of his sister Pulcheria. Naturally of an inferior mind, his education had made him entirely imbecile and unfit for self-command. Pulcheria, who bore the title of *Augusta*, administered the kingdom ably. Of the Western Empire, which had been ceded to Valentinian, Theodosius seized upon West Illyria (423). The Greeks fought with success against the King of the Persians, Varanes. The kingdom of Armenia, thrown into confusion by internal dissensions, and claimed at the same time by the Romans and the Persians, became now a bone of contention between the two nations (440). Attila laid waste the dominions of Theodosius, and obliged him to pay tribute (447). After the death of her brother Pulcheria was acknowledged empress (450). She was the first female who attained this dignity. She gave her hand to the senator Marcian, and raised him to the throne. His wisdom and valour averted the attacks of the Huns from the frontiers, but he did not support the Western Empire in its wars against the Huns and the Vandals with sufficient energy. He afforded shelter to a part of the Germans and Sarmatians who were driven to the Roman frontiers by the incursions of the Huns. Pulcheria died before him in 453. Leo I. (457), a prince praised by contemporary authors, was chosen successor of Marcian. His expeditions against the Vandals (467) were unsuccessful. His grandson Leo II. succeeded, but survived only a few months, when Zeno, the father of Leo, who had previously been appointed his colleague, became sole emperor (474). The government of this weak emperor, who was hated by his subjects, was disturbed by rebellions and internal disorders of the empire. The Goths depopulated the provinces till their king Theodoric turned his arms against Italy (489). Ariadne, widow of Zeno, raised the minister Anastasius, whom she married, to the throne (491). The nation, once excited to discontents and tumults, could not be entirely appeased by the alleviation of their burdens and by wise decrees. The forces of the empire, being thus weakened, could not offer an effectual resistance to the Persians and the Bulgarians along the Danube. To prevent their incursions into the peninsula of Constantinople, Anastasius built the *long wall*, as it is called. After the death of Anastasius the soldiers proclaimed Justin emperor (518). Notwithstanding his low birth he maintained possession of the throne. Religious persecutions, which he undertook at the instigation of the clergy, and various crimes, into which he was seduced by his nephew Justinian, disgrace his reign. After his early death, in 527, he was succeeded by the same Justinian (which see), to whom, though he deserves not the name of the *Great*, many virtues of a ruler cannot be denied. He was renowned as a legislator, and his reign was distinguished by the victories of his general Belisarius; but how unable he was to revive the strength of his empire, was proved by its rapid decay after his death. Justin II., his successor (565), was an avaricious, cruel, weak prince, governed by his wife. The Longobardi (Lombards) tore from him part of Italy (568). His war with Persia, for the possession of Armenia (570), was unsuccessful; the Avari plundered the provinces on the Danube, and the violence of his grief at these misfortunes deprived him of reason. Tiberius, his minister, a man of merit, was declared Cæsar, and the general, Justinian, conducted the war against Persia with success. The Greeks now allied themselves, for the first time, with the Turks. Against his successor, Tiberius II. (578), the Empress Sophia and the General Justinian conspired in vain. From the Avari the emperor purchased peace; from the Persians it was extorted by his General Mauritius or Maurice (582), who, after the death of Tiberius in the same year, was declared his successor. Mauritius, under other circumstances, would have made an excellent monarch, but, for the times, he wanted prudence and resolution. He was indebted for the tranquillity of the eastern frontiers to the gratitude of King Chosroes II., whom, in 591, he restored to the throne, from which he had been deposed by his subjects. Nevertheless, the war against the Avari was unsuccessful, through the errors of Commentiolus. The army was discontented, and was irritated now by untimely severity and parsimony, and now by timid indulgence. They finally proclaimed Phocas, one of their officers, emperor. Mauritius was taken in his flight and put to death (602). The vices of Phocas and his incapacity for government produced the greatest disorder in the empire. Heraclius, son of the governor of Africa, took up arms, conquered Constantinople, and caused Phocas to be executed (610). He distinguished himself only in the short period of the Persian war. During the first twelve years of his reign the Avari, and other nations of the Danube, plundered the European provinces, and the Persians conquered the coasts of Syria and Egypt. Having finally succeeded in pacifying the Avari, he marched against the Persians (622), and defeated them; but during this time the Avari, who had renewed the war, made an unsuccessful attack on Constantinople in 626. Taking advantage of an insurrection of the subjects of Chos-

roes, he penetrated into the centre of Persia. By the peace concluded with Siroes (628), he recovered the lost provinces and the holy cross. But the Arabians, who now became powerful under Mohammed and the caliphs, conquered Phœnicia, the countries on the Euphrates, Judea, Syria, and all Egypt (635–641). Among his descendants there was not one able prince. He was succeeded by his son Constantine III., probably in conjunction with his stepbrother Heracleonas (641). The former soon died, and the latter lost his crown in a rebellion, and was mutilated. After him Constans, son of Constantine, obtained the throne (642). His sanguinary spirit of persecution, and the murder of his brother Theodosius (650), made him odious to the nation. The Arabians, pursuing their conquests, took from him part of Africa, Cyprus, and Rhodes, and defeated him even at sea (653). Internal disturbances obliged him to make peace. After this he left Constantinople, and in 663 began an unsuccessful war against the Lombards in Italy. He died at Syracuse in 668. Constantine IV., Pogonatus, son of Constans, vanquished his Syracusan competitor Mezentius, and, in the beginning of his reign, shared the government with his brothers Tiberius and Heraclius. During the early part of his reign the Arabians inundated all Africa and Sicily, penetrated through Asia Minor into Thrace, and attacked Constantinople, for several successive years, by sea. Nevertheless, he made peace with them on favourable terms. But on the other hand, the Bulgarians obliged him to pay a tribute (680). Justinian II., his son, who succeeded him in 685, weakened the power of the Maronites, but fought without success against the Bulgarians and against the Arabians. Leontius dethroned this cruel prince, and after mutilating, banished him to the Tauric Chersonese (695). Leontius was dethroned by Apsimar, or Tiberius III. (698), who was dethroned by Trebelius, king of the Bulgarians, who restored Justinian (705); but Philippicus Bardanes rebelled anew. With Justinian II. the race of Heraclius was extinguished. The only care of Philippicus was the spreading of Monothelism, whilst the Arabians wasted Asia Minor and Thrace. Philippicus reigned from 711 to 713, when he was deposed by Anastasius, who at the end of three years retired to a monastery, the army sent out against the Arabians having revolted against him, and proclaimed their leader, Theodosius, emperor. This prince, known as Theodosius III., after a reign of only fourteen months, was compelled in his turn to yield the throne to Leo the Isaurian, general of the army of the East, who refused to recognize him, and marched against Constantinople (May, 717). Leo repelled the Arabians from Constantinople, which they had attacked for almost two years, and suppressed the rebellion excited by Basilius and the former emperor Anastasius. From 726 the abolition of the worship of images absorbed his attention, and the Italian provinces were allowed to become a prey to the Lombards, who thus put an end to the exarchate of Ravenna (728), while the Arabians plundered the eastern provinces. After his death (741), his son Constantine V. ascended the throne—a courageous, active, and noble prince. He vanquished his rebellious brother-in-law Artabasdus, wrested from the Arabians part of Syria and Armenia, and overcame at last the Bulgarians, against whom he had been long unsuccessful. He died (775), and was succeeded by his son Leo IV., who fought successfully against the Arabians, and this latter by his son Constantine VI. (780), whose imperious mother, Irene, his guardian and associate in the government, raised a powerful party by the restoration of the worship of images. He endeavoured, in vain, to free himself from the dependence on her and her favourite, Stauratius, and died in 797, after having had his eyes put out. The war against the Arabians and Bulgarians was long continued; against the first it was unsuccessful. The design of the empress to marry Charlemagne excited the discontent of the patricians, who placed one of their own order, Nicephorus, upon the throne (802). Irene died in a monastery. Nicephorus became tributary to the Arabians, and fell in the war against the Bulgarians (811). Stauratius, his son, was deprived of the crown by Michael I., and he, in turn, by Leo V. (813). Leo was dethroned and put to death by Michael II. (820). During the reign of the latter the Arabians conquered Sicily, Lower Italy, Crete, and other countries. He prohibited the worship of images, as did also his son Theophilus (829–42). Theodora, widow of Theophilus and guardian of his son Michael III., put a stop to the dispute about images (842). During a cruel persecution of the Paulicians, considered to be an offshoot of the Manichæans, the Arabians devastated the Asiatic provinces. The dissolute and extravagant Michael confined his mother in a monastery. The government was administered in his name by Bardas, his uncle, and after the death of Bardas by Basil, by whom Michael was put to death (867). Basil I., who came to the throne in 867, was not altogether a contemptible monarch. He died 886. The reign of his learned son, Leo VI. (the Philosopher), was not very happy. He died 911. His son, Constantine VII., Porphyrogenitus (that is, 'born in the purple'), a minor when he succeeded his father, was placed under the guardianship of his colleague, Alexander, and after Alexander's death, in 912, under that of his mother Zoe. Romanus Lecapenus, his general, obliged him, in 919, to share the throne with him and his children, Constantine VIII. and Stephanus. Constantine subsequently took sole possession of it again, and reigned mildly, but weakly. His son, Romanus II., succeeded him in 959, and fought successfully against the Arabians. To him succeeded, in 963, his general Nicephorus II. (Phocas), who was put to death by his own general, John Zimisces (969), who carried on a successful war against the Russians. Basil II., son of Romanus, succeeded this good prince in 976. He vanquished the Bulgarians and the Arabians. His brother, Constantine IX. (1025), was not equal to him. Romanus III. became emperor (1028) by a marriage with Zoe, daughter of Constantine. This dissolute but able princess caused her husband to be executed, and successively raised to the throne Michael IV. (1034), Michael V. (1041), and Constantine X. (1042). Russians and Arabians meanwhile devastated the empire. Her sister Theodora succeeded her on the throne (1054). Her successor, Michael VI. (1056), was dethroned by Isaac Comnenus in 1057, who became a monk (1059). His successor, Constantine XI., Ducas, fought successfully against the Uzes. Eudocia his wife, guardian of his sons, Michael, Andronicus, and Constantine, was intrusted with the administration (1067), married Romanus IV., and brought him the crown. He carried on an unsuccessful war against the Turks, who kept him for some time prisoner. Michael VII., son of Constantine, deprived him of the throne (1071). Michael was dethroned by Nicephorus III. (1078), and the latter by Alexius I., Comnenus (1081). Under his reign the Crusades commenced. His son, John II., came to the throne (1118), and fought with great success against the Turks and other barbarians. The reign of his son, Manuel I., who succeeded him (1143), was also not unfortunate. His son, Alexius II., succeeded (1180), and was dethroned by his guardian, Andronicus (1183), as was the latter by Isaac (1185). After a reign disturbed from without and within, Isaac was dethroned by his brother, Alexius III. (1195). The Crusaders restored

him and his son, Alexius IV.; but the seditious Constantinopolitans proclaimed Alexius V., Ducas Murzuphlus, emperor, who put Alexius IV. to death. At the same time Isaac II. died. During the last reigns the Kings of Sicily had made many conquests on the coasts of the Adriatic. The Latins now forced their way to Constantinople (1204), conquered the city, and retained it, together with most of the European territories of the empire. Baldwin, count of Flanders, was made emperor; Boniface, marquis of Montferrat, obtained Thessalonica as a kingdom, and the Venetians acquired a large extent of territory. In Attalia, Rhodes, Philadelphia, Corinth, and Epirus, independent sovereigns arose. Theodore Lascaris seized on the Asiatic provinces, in 1206 made Nice (Nicæa) the capital of the empire, and was at first more powerful than Baldwin. In 1204 a descendant of the Comneni, named Alexius, established a principality at Trebizond, in which his great-grandson John took the title of emperor. Neither Baldwin nor his successors were able to secure the tottering throne. He himself died in captivity among the Bulgarians (1206). He was followed first by Henry, his brother, then by Peter, brother-in-law of Henry (1217), and then by Robert of Courtenay, son of Peter, who succeeded in 1219, but was not crowned till 1221. With the exception of Constantinople, all the remaining Byzantine territory, including Thessalonica, was conquered by John, emperor of Nice. Baldwin II., brother of Robert, succeeded and reigned under the guardianship of his colleague, John of Brienne, king of Jerusalem, till 1237, after which he was sole ruler till 1261. In that year Michael Palæologus, king of Nice, conquered Constantinople, and Baldwin died in the West, a private person. The sovereigns of Nice up to this period were Theodore Lascaris (1206); John Ducas Vatatges, a good monarch and successful warrior (1222); Theodore II., his son (1254); John Lascaris (1259), who was deprived of the crown by Michael Palæologus in Dec. 1259, who himself received the crown Jan. 1, 1260. In 1261 Michael took Constantinople from the Latins. He laboured to unite himself with the Latin Church, but his son, Andronicus II. (1282), renounced the connection. Internal disturbances and foreign wars, particularly with the Turks, threw the exhausted empire into confusion. Andronicus III., his grandson, obliged him to divide the throne, and at length wrested it entirely from him (1328). He waged war unsuccessfully against the Turks, and died in 1341. His son, John Palæologus, was obliged to share the throne with his guardian, John Cantacuzene, during the first years of his reign. The son of the latter, Matthew, was also made emperor. But John Cantacuzene resigned the crown, and Matthew was compelled to abdicate (1355), when John Palæologus, the son of Andronicus III., became sole emperor. Under his reign the Turks first obtained a firm footing in Europe, and conquered Gallipoli (1357). The family of Palæologus from this time were gradually deprived of their European territories, partly by revolt, partly by the Turks. The Sultan Amurath took Adrianople (1361). Bajazet conquered almost all the European provinces except Constantinople, and obliged John to pay him tribute. The latter was, some time after, driven out by his own son, Andronicus, who was succeeded by his second son, Manuel (1391). Bajazet besieged Constantinople, defeated an army of western warriors under Sigismund, king of Hungary, near Nicopolis (1396), and Manuel was obliged to place John, son of Andronicus, on the throne. Timur's invasion of the Turkish provinces saved Constantinople for this time (1402). Manuel then recovered his throne, and regained some of the lost provinces from the contending sons of Bajazet. To him succeeded his son John, Palæologus II. (1425), whom Amurath II. stripped of all his territories except Constantinople, and laid under tribute (1444). To the Emperor John succeeded his brother Constantine Palæologus. With the assistance of his general, Justinian, a Genoese, he withstood the superior forces of the enemy with fruitless courage, and fell in the defence of Constantinople, by the conquest of which (May 29, 1453) Mohammed II. put an end to the Greek or Byzantine Empire. In 1461 David Comnenus, emperor of Trebizond, submitted to him, and at a subsequent period was put to death. See COMNENI.

BYZANTINE HISTORIANS, a series of Greek authors, whose works relate to the history of the lower Greek Empire, from the fourth century until the conquest of Constantinople by the Turks, and to the Turkish history until the end of the sixteenth century. These authors display the faults of a degenerate period, but they contain also the relics of former excellence. They are the principal source of the history of the decay of the Roman Empire; and a correct delineation of the condition and character of the modern Greeks requires an intimate acquaintance with them, of which D'Anse de Villoison is an example. They contain besides an inexhaustible store of materials relative to the great migration of the nations, and the new political system to which it gave rise in the north of Asia and in Europe, and illustrative of ecclesiastical history. An excellent collection of these authors was printed in folio at the Louvre, during the seventeenth century, and was increased by texts printed at Rome, Leipzig, and other places during the seventeenth and eighteenth centuries, and even in the first years of the nineteenth century. The whole collection includes thirty-nine works, the earliest of which was published at Paris in 1645, and the latest in 1819. A reprint of the first twenty-six articles of this collection was published at Venice in twenty-three volumes, between 1722 and 1733, with the title Byzantinæ Historiæ Scriptores in unum Corpus Redacti. The most recent and best collection is that which was begun in 1828 by Niebuhr, with the co-operation of J. Bekker, L. and W. Dindorf, Schopen, Meinecke, Lachmann, and others, and was continued by the Berlin Academy. Its title is Corpus Scriptorum Historiæ Byzantinæ, editio Emendatior et Copiosior, and the first volume was published at Bonn in 1828. Stritter, keeper of the royal achives at Moscow under Paul, has proved, by an excellent extract (Memoriæ Populorum ad Danubium, Pontum Euxinum, Paludem Mæotidem, Mare Caspium et inde magis ad Septentrionem Incolentium, Petersb. 1771–79, four vols. 4to), their importance as sources of ancient Russian history. Four of them form a continued history of the Byzantine Empire to the year 1470, viz.: (1) Zonaras; (2) Nicetas Acominatus Choniates; (3) Nicephorus Gregorias; (4) Laonicus, or Nicholas Chalcondylas of Athens. The most remarkable of the others are, in chronological order: (1) Procopius of Cæsarea, rhetorician at Constantinople. We have from him eight books of histories, viz. Persica, in four books, and Gothica, in four books, published separately by Höschel (Augsburg, 1607); and Secret History (Anecdota), in nine books (in which, contrary to the opinions expressed in his first work, he shows himself very inimical to the Emperor Justinian), published by Reinhard, at Erlangen and Leipzig (1753).—(2) Agathias, after the death of Justinian, wrote an account of his reign, in five books, published at Paris (1660, folio).—(3) Theophylact of Egypt. We have from him a history of the Emperor Maurice, in eight books, to 604 (Paris, 1648).—(4) Nicephorus, patriarch of Constantinople, who has left several learned theological writings. His Breviarium Historicum extends

from the death of the Emperor Maurice to 770 (Venice, 1759).—(5) Joh. Scylitzes held several offices at Constantinople. We have from him an abridgment of history, from 811 to the time of Isaac Comnenus (1057). It appeared in a Latin translation (Venice, 1570). The same work he continued to the time of Alexius Comnenus (1081). The whole work is contained in the collection published at Rome.—(6) Anna Comnena, daughter of the Emperor Alexius I., died about 1150. She wrote an Alexias, or a work on the history of her father, Alexius Comnenus, in fifteen books, edited by Höschel in Augsburg, 1610. (A more complete edition, Paris, 1651, folio).—(7) George Acropolita, a statesman in Constantinople, wrote an abridgment of the Byzantine history, from the capture of Constantinople by the Latins, 1204, to its recapture, 1260 (Paris, 1651).—(8) George Pachymer held high offices in church and state in Constantinople. He wrote a Byzantine history, in thirteen books, from the Birth of Michael Palæologus, 1158 to 1308 (Rome, 1666–69).—(9) John Cantacuzenus, the emperor, is the author of a Byzantine history, in four books, from 1320–54 (Paris, 1645).—(10) George Codinus, intendant of the palace in Constantinople. We have from him several works on the antiquities of Constantinople. The most important of them is, On the Offices and Services appertaining to the Court and the Church of Constantinople (Paris, 1648, folio).—(11) Constantinus Porphyrogenneta, the Emperor Constantine VII., wrote the life of his grandfather, Basilius Macedo, edited by John Meursius. We have also a work of his own on government, written for his son, and on the provinces of the Eastern and Western Empire, besides other writings and collections. The most important treats of the ceremonies of the Byzantine court. It was edited by Leich and Reiske (Leipzig, 1751–54, two vols.)—(12) After the capture of Constantinople, Ducas wrote a Byzantine history, from 1341 to the capture of Lesbos, 1462. It was edited by Bekker, and published in 1834.

BYZANTINE SCHOOL OF ART. After Constantine the Great had made the ancient Byzantium the capital of the Roman Empire, and ornamented that city, which was called after him, with all the treasures of Grecian art, a new period commenced in the history of art. From this time it became subservient to Christianity, as the religion of the state. All the productions of heathen artists, which formed suitable ornaments for Christian cities and temples, were now employed in the service of the invisible God, and art began by slow degrees to rise from its degeneracy, under the influence of Christianity. At the time when Constantine converted Byzantium into an imperial residence splendour and ornament had already supplanted the simplicity of ancient taste. Asiatic luxury had become predominant, and this laid more stress on richness of material and decoration than on purity of conception. Architecture, which adorned the *Forum Augusteum*, in Byzantium, with a fourfold colonnade, and created splendid *curiæ*, imperial palaces, baths, theatres, and porticoes, preserved for a long time the grand forms of classic times, and deviated from them slowly and gradually, at first in the Christian churches, as a model for which Justinian built the Church of St. Sophia, and decorated it with oriental magnificence, in 537. But even in architecture, the costliness and colour of the marble was soon considered as of more importance than the proportion of the parts and the distribution of the columns. There are, however, as late as the ninth century, admirable works of Greek architecture. This period was still less favourable to the simplicity of sculpture. The mythology of ancient Greece afforded sacred subjects to the statuary. Gods appeared in the human form, and the human figure, in the Grecian model, was raised to the classical ideal. On the introduction of the Christian religion, sculpture was confined to the imitation of nature; afterwards to portraits, and to mere purposes of ornament, for Christianity is averse to sensible representations of the Divinity. Statues of emperors, of great statesmen and generals, became the subjects of the sculptor, and seem eventually to have given rise to the introduction of the worship of images in the Christian churches, since the custom of erecting monuments and statues to the emperors and distinguished bishops was extended to martyrs and saints, and was afterwards followed by the superstitious worship of them. (See ICONOCLASTS.) Though images of this kind became more frequent in the third and fourth centuries, there were yet many Christian teachers, who, like Tertullian at an early period, declared the fine arts inventions of the devil, and the pagan statues possessed by demons. This superstition often caused the destruction of the noblest statues of the Grecian gods by popular violence. It was not until after many difficulties, that, in the ninth century, the worship of images was established in the Greek Empire, and after that time appeared the first known traces of Christian sculpture and painting in the East. But even those statues to which sculpture was now confined, no longer displayed the freedom and dignity of ancient art. The pride of the emperors demanded statues of gold and silver, as long as their treasury, filled by exhausting their subjects, could supply them. Images of bronze and marble were despised. And how seldom could the artist be inspired by his subject, when flattery erected monuments and busts to the most worthless of men! It was natural, that, with the loss of elevated subjects, the dignity of art should be lost in petty technical details. Heyne, in his treatise on the later works of art under the Byzantine emperors (Commentat. Soc. Götting., vol. xi.), observes that the representations of the emperors, of distinguished men, or of saints, were uniform in figure or character. The vestiges of genius were nowhere seen in free creations and ideal forms, in the desire of truth and expression. From the time of Justinian downwards the true measure and proportion of the parts, and the correctness of the outlines, were so much neglected, that the representations became constantly more like masks, spectres, and monsters. The old Roman faces were seldom represented: the forms appeared to belong to quite another race—to some new nation; and it was often necessary to write the names under them. In the perspective of the figures no rules were observed. It became at this time the great object to imitate the costly robes of the emperors, bishops, and other noble persons, who gratified their vanity not only with purple garments, but by the extravagant use of pearls and precious stones, which were worn in long pendants from the ear, in bracelets and in necklaces. The whole mantle was often garnished with precious stones, and round the edge ran a double row of pearls. Such garments the emperors used to change several times a day. As such exterior ornaments are foreign to sculpture, which prefers the naked figure, or a simple drapery, it is easy to see why the production of statues ceased so soon. In the lists of Byzantine works of sculpture given by authors of the first centuries there are no images of Christ, no statues of apostles and saints. Instead of them we find only crucifixes, painted, or ornamented with mosaic work. If there were any such images in earlier times they must have been destroyed in the time of the Iconoclasts, as was the case with the bronze statue of Christ near that of Constantine, which was demolished by Leo the general destroyer of images, and

the representations of the Good Shepherd, praised by Eusebius, and that of Daniel among the Lions, with which Constantine adorned the public fountains. An image of the Saviour, surrounded by angels, and worked in mosaic, is described by Photius. We also find mention of the images of two angels upon the forum of Constantine, the representation of Adam and Eve, the bronze statue of Moses, with which Justinian is said to have ornamented the *curiæ*, and that of Solomon of an earlier date. According to Eusebius the roof of the palace in Constantinople was also decorated with rich mosaics of gold and costly stones, representing scenes from the passion of Christ; and another, which Justinian erected, in Chalcis, contained representations of events in the war against the Vandals. The most celebrated of all the mosaics in the interior of St. Sophia's Church in Constantinople has been preserved in fragments to modern times. The taste of those times inclined, in general, more to mosaic works than to sculpture; because the former were rendered attractive by the costliness and colours of the stones. Sculpture was employed particularly in ornamenting altars, tabernacles, holy vessels, and urns, which were made of the most precious marble. The art of engraving on stones was also long preserved. In the art of painting, which was imitated in mosaic, the taste of this age was the same as in sculpture—pleased with gold and lively colours, but careless about truth of representation, and beauty and grandeur of conception. The first germ of a Christian style of art was, however, developed in the Byzantine pictures. The ideal representations of human figures, which the ancient Grecian artists had exhibited in their master-works, were necessarily given up by Christian artists: another ideal was to be formed, which should not recall the odious features of paganism. But the ideal of the Saviour, of the mother of Christ, and of his apostles, could be formed only by degrees. The artists, who had nothing real and material before them, but were obliged to find, in their own imaginations, conceptions of the external appearance of sacred persons, could give but feeble sketches of their ideas by means of their imperfect art. In their representations of Jesus and his apostles, they finally adopted the national features of the Jews. In the figure, and sometimes even in the countenance, they imitated the external appearance of some revered bishop. The hands were often lifted, as in blessing, or one hand was laid upon the breast, or holding a book. Thus the figures of the founders of the Christian church were first represented in paintings. They were also exhibited in mosaic, but not in marble. Christian subjects, indeed, are generally more suited to painting, which gives the outward expression of the mind, by means of light, and shade, and colours, than to sculpture, which, on the contrary, elevates the external form to a kind of spiritual dignity. As the artists cared but little for a faithful imitation of nature, but were satisfied with repeating what was once acknowledged as successful, it is not strange that certain forms, introduced by the authority of some celebrated artists, and approved by the taste of the time, should be made, by convention, and without regard to truth and beauty, general models of the human figure, and be transmitted as such to succeeding times. In his treatise on the continuation of the arts in Constantinople (Comment. Soc., Götting. vol. xiii.), Heyne remarks, that art continued to be exercised here, as far as it consists in mechanical skill in the use of instruments, in particular rules and general precepts; but taste, and a sense for truth and simple beauty, had vanished. Delicacy, elegance, and gracefulness in design, proportion of parts, harmony of the figures, and beauty of form, were lost. The artists did not even aim at an accurate representation, but were contented with rude and general outlines, as may be seen in the coins of the time. These deformed and meagre figures were slavishly copied, and labour was lavished on costly and often tasteless ornaments. A certain propensity to the grotesque prevailed, even in architecture. The influence of ancient works of art continually decreased as their number was diminished by the violences of war, by superstition, by avarice, and by the hand of time. Most of the then existing works of antiquity perished in the capture of Constantinople, during the Crusades of 1204 and 1261; and thus the city had long been deprived of its most beautiful ornaments when it was taken by the Turks in 1453.

This was, in general, the state of art in the Byzantine Empire. Its influence has been felt ever since; in earlier times, by the connection of the imperial residence in the East with the Western Empire, and afterwards by commercial intercourse and the Crusades.

Let us first consider this connection of the lower Greek art with the west of Europe, and in particular with Italy. According to Stieglitz (on German Architecture), the character of the lower Greek architecture was tranquillity and simplicity, originating from poverty of ideas and materials, and terminating in heaviness. But this architecture, which prevailed till the earlier part of the middle ages, preserved the seed from which, in later times, a new and better style sprang up. Constantinople became a school of architecture, from which artists issued to all parts of the Roman Empire, as far as Britain, to erect churches after the model of St. Sophia. They also penetrated into the countries of the East, introducing their art among the Arabians, who applied it to the erection of their mosques, and among the Moors in Spain, who formed their own style from it. The lower Greek or Byzantine style kept itself pure and uncorrupted in Italy, under the Lombards, as well as under the Goths, whose artists came from the East; and thence it spread, during the reign of Charlemagne, to Germany, Gaul, and Britain. The style of architecture introduced by Charlemagne into Germany was a corruption of that prevailing in the lower Greek Empire, from which, together with the Arabian and German style, sprang the true German or Gothic architecture, which flourished from the thirteenth to the sixteenth century. (See ARCHITECTURE, HISTORY OF.) The *basso-rilievos* on the oldest churches in Germany, and some pictures in them, still show the traces of the lower Grecian art. These are also to be found in Gori (for example, Diptych, vol. iii. pp. 33, 270, tab. iv. xxiii.) and Ciampini (Vet. Moniment. part ii. p. 104, tab. xxix.) representations of Italian and Gallic sculpture, which, in their drapery, ornaments, and architectural forms, betray a Byzantine origin. In regard to painting we are indebted to the Byzantines for the preservation of some portion of its ancient excellence. As in the early period of Christianity, Grecian and Roman art in general differed but little, since both sprang from the ruins of ancient art; so in painting, no striking difference is to be observed between them. They became, however, constantly more and more distinct in later times, as Greece and Italy became more and more separated. Short thick bodies, stiff and forced attitudes, exaggeration of the characteristic parts, in particular of the eyes, faces contracted above and broad below, and marked with overcharged tints, short thick hair, highly arched eyebrows, awkward drapery, loaded with unnatural folds, distinguish the Greek pictures as far back as the fifth century. The better paintings, which are found particularly in manuscripts, show a neat, accurate, and diligent execution. When

art declined in Italy, particularly in the ninth century, painting was still cultivated by the Greeks, who, driven from home by the disputes concerning images, carried it into Italy and other countries, and adorned the churches there. Thus the lower Greek or Byzantine school was the mother of the old Italian school, and of the lower Rhenish, which preceded the German. The relation of both is seen in the similarity of the Italian pictures to those of the lower Rhenish school. According to the common statement several Grecian artists passed over into Italy in the beginning of the twelfth century, and adorned the churches of Florence and Venice with their works. These were joined by the Italian artists, who founded, in the thirteenth century, a school of art and painting (see ITALY—Art), which, in its development, acquired a peculiar character, distinguished by beauty both of conception and execution. The lower Rhenish school, however, which is also called the *school of Cologne*, as it flourished chiefly from the beginning of the fourteenth to the beginning of the fifteenth century, in the city of Cologne, appears to have retained still more closely the Byzantine character than the Italian did, since there are traces of it even in the later German school, exhibited in the symmetrical and pyramidal grouping of the objects, in the close drapery, and in the love of ornament and splendour, shown particularly in the golden backgrounds. The collection of the brothers Boisserée contains the most excellent works of this school. John Van Eyck first set the example of a more individual representation of natural objects, in opposition to the general representations of the lower Greek, and the ideal style of the old Roman school. More exact accounts are wanting of the historical connection of the lower Rhenish and of the old Italian school with the Byzantine style of art. On the earlier times of the Byzantine art, see Histoire de l'Art par les Monumens depuis sa Décadence au 14me Siècle, jusqu'à son Renouvellement au 16me (Paris, 1810, folio).

BYZANTIUM, the name of the city of Constantinople before its name was changed by Constantine the Great. According to the mythological account there was a small village called Lygos on the site of the future Byzantium as early as the time of the Argonautic expedition. On this spot Byzas, a Megarian, accompanied by a number of emigrants, landed in 658 B.C., and selected it as in every respect suitable for the foundation of a colony. The city which was built by the first colonists he named after himself. Other colonists followed from different quarters, especially from Miletus, and Byzantium was already a flourishing town when it was taken and sacked by the Persians, in the reign of Darius, the son of Hystaspes. After the retreat of the Persians Byzantium soon recovered itself. During the Peloponnesian war it acknowledged for some time the supremacy of the Athenians, from whom at a later period the Byzantines received support in their resistance against Philip of Macedon. The barbarian Thracians, who occupied the neighbouring territory, and the Celts (Galatians), in their migrations to the East, often appeared to threaten the safety of the town; but in spite of this, chiefly owing to its favourable position for commerce, it continued to prosper, and survived the decay of most of the other Greek cities; and even under the Romans it was left free to manage its own affairs, and was allowed to demand dues from all ships passing through the Bosporus, only part of which was claimed by the Romans. At the end of the second century of the Christian era Byzantium, unfortunately for itself, sided with Pescennius Niger against Septimius Severus. By the latter it was besieged for three years, and when at last it was forced to surrender, Severus ordered its walls to be razed to the ground, deprived the city of its privileges, and placed it under the jurisdiction of the Perinthians. For a time the prosperity of the city was annihilated, until a new and more brilliant era began for it under Constantine the Great. (See CONSTANTINOPLE.) Byzantium was at first a kingdom, but soon after its foundation the form of government was changed into an aristocracy, and that again passed into an oligarchy. In the year 390 B.C. it received from Thrasybulus a democratical constitution, closely resembling that of the Athenians. Byzantium was the great entrepot for the grain trade between the countries bordering on the Black Sea and those bordering on the Ægean. In its immediate neighbourhood excellent wine was grown, and the surrounding seas abounded in tunny fish. In addition to that the Byzantines carried on a large trade with neighbouring countries, exporting slaves, hides, honey, &c.

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